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THE GENUS *APTINOTHRIPS* HALIDAY. A FURTHER NOTE ON
THE LARVAL STAGES (THYSANOPTERA : TEREBRANTIA)

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PROFESSOR YRJO HUKKINON has very kindly sent to me large numbers of *Aptinotrips* larvae from localities in Finland, where *A. styliifer* Tryb. occurs either in the absence of other species of the genus, or as the greatly predominant species as compared with *A. rufus* (Gmel.) Hal.

The specimens were collected during the month of June in the years 1931 to 1936 inclusive, mostly from *Alopecurus pratensis*.

Examination of the 2nd instar larvae confirms entirely the structural differences, between the above-named species, which were elucidated in 1935 *Trans. R. ent. Soc. Lond.* 83 : 503-508, figs. 23, 26-28.

The tentative distinction drawn between the 1st instar of the two species (*loc. cit.* : 507) is, however, not upheld by a study of the new material, and a careful examination of the chaetotaxy and general structure has failed to show any character by which the two species can be separated *in this particular instar*. The pair of setae upon the ventral surface of the 9th abdominal segment alluded to in the footnote to Table II and in the text p. 507 (*loc. cit.*) occurs only in specimens which are in process of ecdysis, and belongs, therefore, to the corresponding segment of the 2nd instar larva, in which it is represented in both species.

While examining the chaetotaxy of the 1st instar larvae both of *A. rufus* and *A. styliifer*, an additional pair of setae (about 4 μ in length) was detected upon the dorsum of the 1st abdominal segment : Table II, p. 507 (*loc. cit.*), therefore, requires emendation also in this respect. Each seta of this pair is placed laterally to the "median" seta of each side.

The fact that the 1st instar larvae of the two species appear to be morphologically inseparable is not surprising, nor does it provide any evidence to the effect that *A. rufus* and *A. styliifer* are even closely allied species. A similar uniformity of structure has been observed in several species of the genus *Thrips*, which, from the morphology of their later developmental stages and their imagines, are quite distinct. It is not improbable that further research will show this uniformity of structure to exist amongst at least closely allied genera, such as *Thrips*, *Taeniothrips*, and *Frankliniella*, in respect of the 1st instar larva only.

ON THE IDENTITY AND SYSTEMATIC POSITION OF TWO HITHERTO MISIDENTIFIED SPECIES OF LYCAENIDAE (LEP. RHOP.)

By FRANCIS HEMMING, C.B.E., F.R.E.S.

IN the present paper I discuss the identity and systematic position of two palaearctic species of LYCAENIDAE. The first of these is the species described as *Papilio argyrognomon* by Bergstrasser in 1779, a species belonging to a complex of closely allied species the nomenclature of which has for many years been in a state of great confusion. The second species dealt with in the present paper was described as *Lycaena subsolanus* by Eversmann in 1851; its type now in Leningrad has not previously been examined, with the result that the identity of this species has never before been determined.

1. The Identity and Systematic Position of *Papilio argyrognomon* Bergstrasser, 1779.

Papilio argyrognomon Bergstrasser is one of three superficially similar insects the nomenclature of which has been hopelessly confused both by early and by modern authors.

Papilio argyrognomon Bergstrasser

Bergstrasser, 1779, *Nom. Ins.* 2 : 76, pl. 46, fig. 1, 2 ♀.

The above species is the type of *Lycæides* Hübner, [1819] (*Verz. bek. Schmett.* (5) : 69). It was included in the genus by Hübner under the name *Lycæides argus* Linnaeus, but (as shown below) that was an erroneous identification.

The nomenclature of the species included in this genus by Hübner as *argus* Linnaeus (which was selected as the type by Scudder, 1872, 4th *Ann. Rep. Peabody Acad. Sci.* 1871 : 54) is difficult to disentangle owing to the existence of three very similar palaearctic species which have been frequently confused with one another by the earlier authors, with the result that modern authors also have failed to appreciate which of the earlier names should be applied to each species. The first of these species to receive a name was named *Papilio argus* by Linnaeus in 1758 (*Syst. Nat.* ed. 10 : 483). Species No. 2 was first named (from a female example) in 1761, when Linnaeus named it *Papilio idas* (*Faun. svec.* ed. 2 : 284). But that name is invalid, since it is a homonym of *Papilio idas* Linnaeus, 1758 (*Syst. Nat.* ed. 10 : 488). Thus by the year 1761 Species No. 2 had been distinguished from Species No. 1 (= *argus* Linnaeus) and had been given an invalid name (= *idas* Linnaeus) only. The first authors to give structural differences distinguishing Species No. 1 (= *argus* Linnaeus) from Species No. 2 (then still without a valid name) were Schiffermüller and Denis (1775, *Schmett. Wien* : 184). Most unfortunately, however, these authors made the mistake of renaming Species No. 1 as *Papilio aegon* and of identifying Species No. 2 as *Papilio argus* Linnaeus. At this stage therefore Species No. 1 had one valid name (= *argus* Linnaeus), and one synonym (= *aegon* [Schiffermüller and Denis]), while Species No. 2 had still no valid name, but had one invalid name (= *idas* Linnaeus), and in addition had by error been given the name *argus* Linnaeus. The above error was undetected for nearly one hundred years until in 1871 Kirby (*Syn. Cat. diurn. Lep.* : 357) pointed out that the name *argus* Linnaeus belonged to Species No. 1 (as explained above) and not to Species No. 2. Kirby therefore quite correctly adopted the

name *argus* Linnaeus for Species No. 1, to which he sank *aegon* [Schiffermüller and Denis] as a synonym. Kirby realised that in these circumstances it would be necessary to find a name for Species No. 2, which he had just deprived of the name *argus* Linnaeus, to which of course it had never been entitled. Kirby therefore looked round the old literature and applied to Species No. 2 the name *Papilio argyrognomon* Bergstrasser, 1779 (*Nom. Ins.* 2 : 76, pl. 46, fig. 1, 2 ♀), that being, as it seemed to him, the oldest valid name for Species No. 2. In the course of the next forty or fifty years the rearrangement of the nomenclature of Species No. 1 and No. 2 came gradually into use, and until recently was the general practice as regards these two species.

It was not until 1917 that Chapman demonstrated the existence of Species No. 3, differing structurally both from Species No. 1 and from Species No. 2, but considerably closer to the latter than to the former. This hitherto unrecognised species he named *Lycaena aegus* Chapman (1917, in Oberthür, *Et. Lép. comp.* 14 : 42–53, pl. 20, fig. 60). It was not long before it was discovered that *Lycaena argus* Linnaeus, var. *ligurica* Oberthür, 1910 (*Et. Lép. comp.* 4 : 201–202, pl. 41, fig. 293 ♂, 294 ♀) was conspecific with *Lycaena aegus* Chapman, 1917. For a time therefore Species No. 3 was known collectively as *Lycaena ligurica* Oberthür. In the years 1930 to 1933, discussion turned to the identity of *Polyommatus ismenias* Meigen (1829, *Syst. Besch. europ. Schmett.* 2 (1) : 33, pl. 49, fig. A, B ♂, C, D ♀). As a result of this discussion, the leaders of which were Heydemann (1930, 1931, 1932), Beuret (1931, 1932), Stempffer and Schmidt (1932), and Stempffer (1932, 1933), it became evident that *ismenias* Meigen was conspecific with *ligurica* Oberthür and *aegus* Chapman, and therefore that Species No. 3 should in future be known as *ismenias* Meigen. The final stage of this complicated story was reached in 1935, when Beuret (*Lambdionea* 35 : 162–172) demonstrated that the insect described and figured by Bergstrasser in 1779 as *Papilio argyrognomon* was not a form of Species No. 2 (as it had come to be regarded since Kirby had applied the name in 1871 to that species), but was in fact a form of Species No. 3. The result of this discovery was (a) that the oldest valid name for Species No. 3 was seen to be *argyrognomon* Bergstrasser, and (b) that the question of the oldest valid name for Species No. 2 (for which *argyrognomon* Bergstrasser was no longer available) was once more reopened. Beuret suggested that to minimise the confusion which was in any case unavoidable the name *argyrognomon* Bergstrasser should be retained for Species No. 2, notwithstanding the fact that (as he had himself very clearly shown) Bergstrasser had himself applied it to Species No. 3 and the fact (very relevant in this connection) that (as he had himself also shown) a subspecies of Species No. 2 occurs in the same locality as that in which the types of *argyrognomon* Bergstrasser (= Species No. 3) were taken. Verity suggested that a return should be made to a suggestion which he had made many years before (1913, *J. linn. Soc. Lond. (Zool.)* 23 : 189) that Species No. 2 should be known by the invalid name *idas* Linnaeus.

I have carefully considered both the above suggestions, and I can find in neither any grounds that would appear acceptable, if the case were submitted (as has been suggested) to the International Commission on Zoological Nomenclature. Verity's suggestion that the Commission should agree to suspend the rules in such a way as to validate a name (= *idas* Linnaeus) which is invalid by reason of its being a homonym, raises a question of principle of great importance. In my opinion, there would need to be very strong grounds indeed to justify any relaxation of the rules in such a case, since Article 35 of the Code states categorically that such names are to be rejected. Beuret's suggestion

that the name *argyrognomon* Bergstrasser should be applied to Species No. 2 (to which Bergstrasser never applied it) and not to Species No. 3, to which he did apply it, is also open to grave objection. If effect were given to this proposal, we should be faced with the position that the original description and figures of *argyrognomon* Bergstrasser applied to one (= Species No. 3), while in future the name would be applied to a wholly different species (= Species No. 2). Under this arrangement, Species No. 2 would have a name (*argyrognomon* Bergstrasser) arbitrarily applied to it, but it would have no original description, no original figures, and no type locality.

In this connection it is necessary to bear in mind also what are the actual powers conferred upon the International Commission by the International Zoological Congress. They are defined as authorising the Commission (under certain conditions) to suspend the rules in any given case "where in its judgment the strict application of the rules will clearly result in greater confusion than uniformity." This essential condition would not be satisfied in the present case. Species No. 3 has only been distinguished as a separate species for twenty years; it is still a relatively little known species without any large literature associated with it; Species No. 2 would, under the strict application of the rules, now bear the name *Argus calliopis* Boisduval, 1832; no one has ever had any doubt as to the specific identity of *calliopis* Boisduval; the change of the name of Species No. 2 from *argyrognomon* (*false*) Bergstrasser to *calliopis* Boisduval would cause some inconvenience, but it would not possibly cause any confusion. My conclusion is therefore that there are no adequate grounds for seeking a suspension of the rules in this case, and therefore that in future Species No. 2 (hitherto wrongly known as *argyrognomon* Bergstrasser) should be called *calliopis* Boisduval.

In order to facilitate the consideration of the history of this case, I give below a summary of the synonymy involved:—

<i>Species No. 1.</i>	<i>Species No. 2.</i>	<i>Species No. 3.</i>
<p>(a) Validly named <i>Papilio argus</i> by Linnaeus in 1758.</p> <p>(b) Renamed <i>Papilio aegon</i> in 1775 by Schiffermüller and Denis.</p> <p>(c) Generally known as <i>aegon</i> until 1871, when Kirby pointed out that this species should be known as <i>argus</i> Linnaeus.</p> <p>(d) Now universally known as <i>argus</i> Linnaeus.</p>	<p>(a) Named <i>Papilio ilas</i> in 1761 by Linnaeus, but this name is invalid, because it is a homonym.</p> <p>(b) Misidentified as <i>argus</i> Linnaeus by Schiffermüller and Denis in 1775.</p> <p>(c) Generally known as <i>argus</i> Linnaeus (of course wrongly) until 1871, when Kirby pointed out that this was inadmissible.</p> <p>(d) In 1871 Kirby applied to this species the name <i>Papilio argyrognomon</i> Bergstrasser, 1779.</p> <p>(e) Beuret's proof in 1935 that the insect described and figured by Bergstrasser as <i>argyrognomon</i> was not this species, but Species No. 3.</p>	<p>(a) First distinguished by structural characters in 1917 by Chapman, who named it <i>Lycaena aegus</i>.</p> <p>(b) Was next identified (specifically, though not subspecifically) with the insect described by Oberthür as <i>Lycaena argus</i> Linnaeus, var. <i>ligurica</i> in 1910.</p> <p>(c) Was known as <i>ligurica</i> Oberthür or as <i>ligurica</i> Courvoisier (by whom the name had been published almost simultaneously) until in period 1930–33 it was established by Heydemann, Beuret, Stempfner and Schmidt that it was conspecific with the insect described by Meigen in 1829 as <i>Polyommatus ismenias</i>.</p>

Species No. 1.	Species No. 2.	Species No. 3.
(e) The correct name for this <i>Plebejus argus</i> (Linnaeus, 1758).	(f) The earliest valid name for this species is <i>Argus calliopsis</i> Boisduval, 1832. (g) The correct name for this species is <i>Lycæides calliops</i> (Boisduval, 1832).	(d) Was shown by Beuret in 1935 to be the same species as that described by Bergstrasser as <i>Papilio argyrognomon</i> in 1779. (e) The oldest valid name for this species is therefore <i>Papilio argyrognomon</i> Bergstrasser, 1779. (f) The correct name for this species is <i>Lycæides argyrognomon</i> (Bergstrasser, 1779).

2. The identity and systematic position of *Lycæna subsolanus* Eversmann, 1851.

One of the numerous difficulties which have hitherto made it impossible satisfactorily to revise the group of species of LYCAENIDAE belonging to the genera *Plebejus* Kluk, 1802, and *Lycæides* Hübner, [1819], has been the difficulty of determining with certainty the identity of the species described as *Lycæna subsolanus* by Eversmann in 1851 (Eversmann, 1851, *Bull. Soc. imp. Nat. Moscou* 24 (Pt. 1), (2) : 620-621). Eversmann's original description reads as follows :—

Lycæna subsolanus.

L. alis superne basi caeruleis, externe nigro-fuscis : nervis nigris, ciliis albis ;—subtus albido-cinereis : lunula discoidali, serie flexuosa serieque submarginali duplici punctorum nigrorum, hac lunulis fulvis signata ; alis posticis præterea punctis basilibus nigris quatuor punctisque nonnullis seriei limbæ externæ argenteo-notatis. Mus.

Nous ne connaissons que le mâle de cette espèce, qui habite les environs d'Irkoutzk. Il a à peu près la taille et le port d'*icarius* : envergure 16 lignes ; et il ressemble par son dessus à quelques individus d'*arion* ou d'*euphemus*, nommément à ceux dont le dessus est dépourvu de points noirs ; son dessous ressemble à celui de l'*argus*.

La moitié basale des quatre ailes du dessus est d'un bleu un peu argenté, qui se perd insensiblement dans le noirâtre de l'extrémité. Toutes les nervures sont noires. La frange est d'un blanc uniforme.

Le dessous des quatre ailes est d'un gris cendré très pâle. Chaque aile est marquée d'une petite lunule discoïdale noire, d'une rangée flexée de points noirs, et de deux rangées limbales, dont l'interne est composée de petits capuchons noirs, l'externe offre des points noirs ; l'espace entre ces deux rangées est occupé de petites taches fauves. Plusieurs points de la rangée externe des ailes inférieures sont marqués d'argenté. Ces mêmes ailes offrent encore quatre points noirs basaux, dont les ailes supérieures sont dépourvues. La frange des quatre ailes est séparée du fond par une ligne noire, marquée de petites taches noires triangulaires, comme dans l'*argus*.

In the first edition of his Catalogue, Staudinger (Staudinger, 1861, in Staudinger and Wocke, *Cat. Lep. Eur.* : 5, no. 108) treated Eversmann's insect as a distinct species, and retained it in the genus *Lycæna* Fabricius.

He placed a dagger mark against it, however, thus signifying that he had not been able to study the original description. In the second edition of his catalogue published ten years later, Staudinger (Staudinger, 1871, in Staudinger and Wocke, *Cat. Lep. europ. Faun* : 10, no. 137) retained *subsolanus* Eversmann in the genus *Lycaena* Fabricius and identified it with *Lycaena lucifera* Staudinger (1867, *Ent. Zig, Stettin*, 28 : 100), which he accordingly sank as a synonym of *Lycaena subsolanus* Eversmann. He added a note that he based this identification on information received from Lederer. In 1892, Staudinger (1892, *Deuts. ent. Z. 'Iris'*, 5 : 316) again considered the identity of this insect. On this occasion he revived the name *Lycaena lucifera* Staudinger, remarking that Eversmann's description of *Lycaena subsolanus*, to which he had sunk it as a synonym in 1871, was unrecognisable. He added that according to Alpheraky *Lycaena subsolanus* Eversmann was "*zweifellos eine etwas variirende Form von Lyc. Argus.*" In the third edition of his catalogue (Staudinger, 1901, in Staudinger and Rebel, *Cat. Lep. pal. Faun*. 1 : 78, no. 544), he no longer regarded Eversmann's description as unrecognisable, having decided to accept Alpheraky's identification of *subsolanus* Eversmann with the insect which in 1892 he had called *Lycaena argus* (Linnaeus) and which he now called *Lycaena argyrognomon* (Bergstrasser).^{*} In making this identification, Staudinger added the following note : "*una ♀ nec ♂ conditu ; teste Alph. certe Argyrogn. ab.*" Staudinger's identification of this insect was adopted by Seitz (Seitz, 1909, *Grossschmett. Erde* 1 : 301), who stated that Eversmann's *subsolanus* was probably only an individual form of *Lycaena argyrognomon* (Bergstrasser) ^{*} in which the basal half of both wings above was bluish with a little silver, the underside recalling *arion* Linnaeus and *euphemus* Hübner.

In 1917, Chapman published a paper (Chapman, 1917, in Oberthür, *Et. Léop. comp.* 14 : 41-57), in which he showed that the insect called *Lycaena argyrognomon* (Bergstrasser) ^{*} by Staudinger in 1901 was confined to Europe, and that what had previously been regarded as its Chinese and Japanese subspecies should be treated in future as belonging to a separate species. Unfortunately, Chapman applied to this hitherto unrecognised species the name *Lycaena micrargus* Butler, 1878. Butler's *micrargus* is, as I have since shown (Hemming, 1932, *Stylops* 1 : 175-176), the Japanese subspecies of *Plebejus argus* (Linnaeus, 1758). In the same article (*ibid.* : 178), I pointed out that it would be necessary to determine which was the oldest of what until Chapman's paper in 1917 had been regarded as the named Asiatic forms of *Lycaena argyrognomon* (Bergstrasser), ^{*} in order to ascertain what was the specific name of the Chinese and Japanese species which he had there misidentified as *Lycaena micrargus* Butler. The oldest of those names was *Lycaena subsolanus* Eversmann, but in view of the uncertainty that then attached to its identification (by Alpheraky and Staudinger) with what they called *Lycaena argyrognomon* (Bergstrasser), and therefore with the Asiatic species which Chapman had misidentified with *Lycaena micrargus* Butler, I thought it better at that time to leave the question of the specific name of Chapman's Chinese and Japanese species (his *micrargus*) as "an open question."

^{*} This insect is the well-known European species which was first clearly distinguished from *Plebejus argus* (Linnaeus, 1758) by Schiffermüller and Denis in 1775. Unfortunately those authors made the mistake of renaming *Papilio argus* Linnaeus, 1758, as *Papilio aegon* Schiffermüller and Denis, and of applying the name *Papilio argus* Linnaeus to the new species the existence of which they had just detected. This initial mistake gave rise to the chain of errors of identification discussed on pp. 2-5 above. As shown on p. 5 above, the correct modern name for the insect misidentified by Schiffermüller and Denis (1775) and by Staudinger (1892) as *Papilio argus* Linnaeus, 1758, and by Staudinger (1901) as *Papilio argyrognomon* Bergstrasser, 1779, is *Lycaeides calliopis* (Boisduval, 1832).

After the publication in 1932 of the paper referred to above, I learnt from Dr. B. P. Uvarov that Eversmann's collection, which included the types of the species described by him in 1851, had passed into the possession of the Zoological Institution of the Academy of Sciences of the U.S.S.R. at Leningrad. Through Dr. Uvarov's kind offices, I was placed in touch with M. N. Filipjev, Curator of the Lepidoptera Section of the Entomological Department of the above Institution. M. Filipjev very kindly undertook to examine the Eversmann collection and to inform me whether Eversmann's type of *Lycaena subsolanus* Eversmann was still in existence. Subsequently, M. Filipjev wrote saying: "The type is preserved in our collection; it is in bad condition, but the antennae are present. It is labelled 'Irkutsk.' It is unique, and certainly a male, not a female. I send you a photograph." The photograph there referred to represents the upperside and is reproduced here as fig. 1. Later, in response to a further request, M. Filipjev very kindly sent me a photograph of the underside of Eversmann's type, which is reproduced here as fig. 2. I desire to take this opportunity of expressing my warm thanks to the authorities of the Zoological Institution at Leningrad and to M. Filipjev for the invaluable help which they have rendered to me in this matter.

The photographs here given of the two surfaces of Eversmann's type of *Lycaena subsolanus* Eversmann immediately dispel all doubt as to the identity



of that insect. It is beyond all question a male of the insect which Bremer named *Lycaena cleobis* in 1861 (Bremer, 1861, *Bull. Acad. Sci. St. Petersb.* 3: 472). Eversmann's name has ten years' priority over Bremer's *cleobis*, and this species must therefore in future be known as *Lycaeides subsolanus* (Eversmann). I place it in the genus *Lycaeides* Hübner, [1819], since an examination of its male genitalia shows beyond question that it is congeneric with *Lycaeides argyrognomon* (Bergstrasser), the type of *Lycaeides* Hübner. To the discussion regarding this generic name in my *Generic Names of the Holarctic Butterflies* (1: 107-108), published in 1934, it is only necessary here to add that at its meeting held in Lisbon in September 1935 the International Commission on Zoological Nomenclature agreed upon a suspension of the rules in the case of the name *Lycaeides* Hübner, and finally designated *Papilio argyrognomon* Bergstrasser as its type.

As stated in Eversmann's original description and as confirmed by M. Filipjev's examination of Eversmann's type, the type locality of *Lycaeides subsolanus* (Eversmann) is Irkutsk. Bremer described his *cleobis* from "Nordseite des Baikal Sees; in Daurien und dem Bureja Gebirge, zwischen der Ussuri-Mundung und dem Noor." Since Irkutsk is situated on the north-western shore of Lake Baikal, the type locality of *subsolanus* Eversmann is identical with the first of the localities given by Bremer in his original description of *cleobis*. The latter name is thus an absolute synonym of *subsolanus* Eversmann, and is not even available as a subspecific name.

NEW AUSTRALIAN CURCULIONIDAE (COL.)

By Sir GUY A. K. MARSHALL, C.M.G., F.R.S.

OF the seven species here described, the five from Queensland were kindly submitted by Mr. R. Veitch, Chief Entomologist and Director of Research, Department of Agriculture, Queensland. The types of all the species have been deposited in the British Museum.

OTIORRHYNCHINAE.

Neomerimnetes flindersiae sp. n.

♂♀. Derm red-brown, with dense brown and grey scaling; prothorax brown, with an indistinct darker median stripe and a broad dark stripe on the pleurae; elytra dorsally light brown more or less heavily mottled with dark brown, the lateral margins grey or brownish-grey as far as stria 7, a variable oblique greyish discal stripe starting from the lateral stripe before the middle and reaching stria 2 behind the middle, a rather conspicuous variable dark patch immediately behind it, and the apical area more or less suffused with grey; underside with uniform dense grey scaling.

Head with dense brown scaling that entirely conceals the sculpture and a narrow pale ring round the eyes, which are moderately convex, the forehead flat. *Rostrum* longer than broad, a little longer than the head, parallel-sided in the basal half, roundly dilated in front; the sides almost vertically declivous in the basal half, the dorsal area flat, with dense scaling hiding the sculpture and dark recumbent setae, the apical area with sparse sub-metallic scales; the small epistome triangular, flat, shallowly punctate. *Antennae* red-brown, the scape slight exceeding the hind margin of the eye, squamose and with dark recumbent setae; funicle with joint 1 as long as 2 + 3, 3-6 subequal and slightly longer than broad, 7 a little broader. *Prothorax* transverse, strongly rounded laterally, broadest at the middle, shallowly constricted near the apex, the constriction continued broadly across the dorsum, truncate at base and apex, the base broader; the dorsum slightly convex longitudinally, highest at the middle, with the surface even, the sculpture being entirely hidden by scaling. *Scutellum* small, round, slightly elevated, with dense grey scaling. *Elytra* ovate, narrower in ♂, widest at the middle, with a small humeral prominence in ♀, which is much less conspicuous in ♂; the dorsal outline rising rather rapidly at the base, then gently convex, and perpendicularly declivous at the apex—rather more abruptly so in ♀; the punctures in the striae clearly visible through the scaling, scarcely diminishing behind, separated by about their own length; the intervals broader than the striae, slightly convex, each with a row of short spatulate suberect curved setae, interval 1 slightly elevated posteriorly, especially in ♂.

Length 3.0-3.5 mm., *breadth* 1.5-1.7 mm.

QUEENSLAND: Imbil, 6 ♂♂, 7 ♀♀, on *Flindersia australis*, xii.1936 (A. R. Brimblecombe).

The genotype, *N. destructor* Blkb. 1900, is a much smaller insect, with the prothorax nearly as long as broad and the apex almost as wide as the base; the scutellum is inconspicuous and not convex; and the elytra lack the humeral prominence and the oblique pale stripe.

The two Queensland species described by Lea (1910), *inflatus* and *sobrinus*, have the prothorax granulate (whereas in *flindersiae*, when the scales are removed, it has very dense subconfluent punctures but no granules), and the elytra have no humeral prominence or oblique pale stripe.

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HYLOBIINAE.

Imbilius gen. n.

Head pyriform, the temples a little shorter than the eyes, which scarcely project beyond them, the forehead narrower than the base of the rostrum. *Rostrum* comparatively long and slender, gently curved; the scrobes passing obliquely beneath the rostrum, commencing at one-third from the apex; mandibles bidentate, with a basal seta; mentum small, transverse, the usual two long suberect setae on the submentum absent. *Antennae* with the scape clavate, reaching the middle of the eye; the club elongate, subpyriform, as long as joints 2-7 of the funicle, the basal joint shorter than the rest together, the sutures transverse; joint 7 of the funicle not annexed to the club. *Prothorax* gently arcuate at the base, the apical margin very obliquely truncate laterally, without postocular lobes. *Elytra* elongate, a little wider than the prothorax, separately acuminate at the apex, with stria 10 abbreviated. *Legs* with the femora moderately clavate, with a small obtuse tooth, the hind pair not nearly reaching the apex of the elytra; tibiae rather short and deep, compressed, shallowly bisinuate on the lower edge, uncinat and with a short mucro on the anterior pair, the hind corbels entirely apical, not ascending; tarsi rather short, joint 3 broadly bilobate, the claws free. *Sternum* with the front coxae contiguous, the prosternum not sulcate, the gular margin broadly sinuate, the metasternum elongate. *Venter* with the intercoxal process rather sharply angulate, produced beyond the coxae; ventrite 2 longer than 3 + 4.

Genotype : *Imbilius araucariae* sp. n.

An isolated genus belonging to the subtribe Hylobiina.

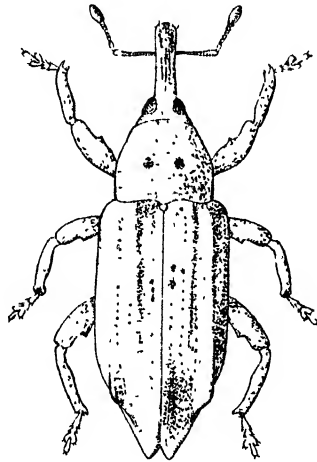


FIG. 1.—*Imbilius araucariae* gen. et sp. n.

Imbilius araucariae sp. n. (fig. 1).

♂♀. Derm red-brown, with dense cinnamon-brown scaling; prothorax with two small round blackish spots in the middle of the disk, a short white line at the base of the lateral margin, and three small white spots along the basal margin (sometimes absent); elytra with a short white humeral line continuous with that on the prothorax and scattered white scales along the striae, also the following blackish spots: one or two at or before the middle

in stria 1 (very variable in occurrence and position), one before the middle in 9, and sometimes one behind the middle in 8; underside with dense brown scaling at the sides of the sternum, and sparse scaling in the middle and on the venter.

Head with the sculpture hidden by dense brown scaling. *Rostrum* shorter than the pronotum (3:4), indistinctly tricarinate on the squamose posterior part, and with fine separated punctures anteriorly. *Antennae* with joint 1 of the funicle as long as 2 + 3, joints 3-7 transverse. *Prothorax* very nearly as long as broad, parallel-sided in the basal third, then narrowing in a curve to the apex without any constriction; the dorsum feebly convex longitudinally, quite smooth, with the sculpture entirely hidden by scaling. *Scutellum* small, round, with dense grey scaling. *Elytra* elongate, subtruncate at the base, parallel-sided from the obliquely rounded shoulders to two-thirds, then rapidly narrowing to the acute triangular apical processes; the very shallow striae with small separated indistinct punctures, each covered by a scale; the intervals broad and with minute inconspicuous appressed setae, interval 1 subcostate on the apical half, 3 strongly costate on the basal half, 5 costate from near the base to the apex being highest and subangulate at the top of the declivity. *Legs* red-brown, with sparser pale brown scaling, finely rugosely punctate.

Length 4.0-4.5 mm., *breadth* 1.5-1.7 mm.

QUEENSLAND: Imbil, 2 ♂♂, 4 ♀♀, bred from *Araucaria cunninghamii*, xi.1936 (*A. R. Brimblecombe*).

ERIRRHININAE.

Glaucopela acaciae sp. n.

♂♀. *Derm* shiny black, the apical margin of the elytra, the antennae and legs testaceous, with the tarsi infuscated; prothorax clothed broadly at the sides with white scales (which extend narrowly across the base) enclosing an indefinite round dark spot on the anterior half, the discal area covered with dark brown scales enclosing a broad median white stripe on the basal half, and on the anterior half a narrow abbreviated white line, which sometimes unites with the basal stripe; elytra with a sutural stripe of dense white scales broadly interrupted about the middle by a patch of dark brown scales, the other intervals with a double row of narrow white scales more or less interrupted as follows: an irregular transverse brown band at one-fourth from the base expanding laterally to form a large humeral patch, another band about the middle extending laterally to interval 8, and usually a variable brown spot at the apex of 7 and 8, but 5 usually brown throughout except at base and apex and 6 white throughout; underside with uniform dense white scaling.

Head with fine dense rugose punctures which are mostly hidden by white scales that are sparser on the vertex, the forehead narrower than an eye and only half as wide as the base of the rostrum; eyes rather narrowly ovate and sharply pointed below. *Rostrum* quite similar in the two sexes, gently curved, almost cylindrical, but widening at the extreme base, which is densely clothed with white scales, the remainder of the rostrum quite bare and shiny with sparse small punctures dorsally and a lateral row of large close punctures from the stroma to the apex. *Antennae* inserted at only one-fifth from the base of the rostrum; scape unusually short, shorter than joint 1 of the funicle, which is slightly longer than 2. *Prothorax* transverse (5:7), gradually narrowing from base to apex, with the sides only slightly rounded; the dorsum convex, highest in the middle, with the dense punctation almost entirely hidden by scaling; the scales in the basal half of the lateral white areas much broader than the others. *Elytra* longer than broad (5:4), very gradually narrowing posteriorly from behind the shoulders; the deep striae fully visible, with close punctures each containing a minute recumbent white seta; the intervals broader than the striae, slightly convex, with the narrow setiform scales slightly raised. *Legs* yellow (except the fuscous

tarsi), with rather dense narrow white scales; tibiae not widened at the apex, the anterior pairs with a strong curved black mucro; joint 3 of the tarsi only slightly wider than 2.

Length 2.0-2.4 mm., *breadth* 1.0-1.1 mm.

CENTRAL AUSTRALIA: Macdonald Downs, 180 miles N.E. of Alice Springs, 3 ♂♂, 2 ♀♀, bred from galls on "mulga" (*Acacia aneura*), x.1934 (*Prof. J. B. Cleland*).

The specimens were forwarded by Mr. D. C. Swan, of the Waite Agricultural Research Institute.

The genotype, *Glauropela unicolor* Pasc., differs from all the subsequently described species, including the present one, in the formation of the forehead, which is as broad as the base of the rostrum and broader than an eye.

G. acaciae differs from the remaining species in its distinctive colouring, the nature of its scaling, and its yellow femora. The scape is longer than the first funicular joint in all the other species except *fuscomarmorea* and *varipes* Blkb., which are distinguished by having the front coxae separated, a character which was not mentioned by Blackburn.

It is probable that the galls on the *Acacia* were not caused by the weevils, but by a Perilampid wasp which was also bred from them, for this wasp, *Trichilogaster* sp., belongs to a genus which is known to make galls on acacias.

CRYPTORRHYNCHINAE.

Pseudapries crux sp. n.

♂♀. Black, with dense dark brown scaling and conspicuous white markings; prothorax entirely brown above, the pleurae entirely white; elytra brown with a large common X-shaped white patch extending from the base to the upper part of the declivity, the anterior arms much longer and narrower, diverging obliquely and reaching the base at the shoulders, the posterior arms short and broad, diverging transversely and reaching interval 5; the triangular area between the anterior arms sometimes grey with brown patches; underside whitish on the middle of the sternum and the two basal ventrites and turning to brown laterally, ventrite 2 with two brown spots on the posterior edge, the last three ventrites brown in the middle and becoming whitish laterally.

Head brown, with the following whitish markings: two longitudinal patches on the vertex, a patch above each eye, and two spots on the forehead (sometimes coalescing). *Prothorax* as long as broad, widest close to base, gradually narrowing in front, shallowly constricted near the apex, the constriction continued broadly and shallowly across the dorsum, the base shallowly bisinuate, the dorsum almost flat, set with small dense rugulose punctures and with two very indistinct small depressions in the middle of the disk, without any median sulcus; a series of short erect clavate scales along the lateral margin on the basal half and along the apical margin (interrupted in the middle), and a transverse row of four small tufts of similar scales beyond the middle. *Scutellum* small, elevated, subconical, with dense brownish-grey scaling. *Elytra* a little wider than the prothorax, trisinuate at the base, parallel-sided from the shoulders to beyond the middle; the punctures in the narrow striae almost or entirely concealed by dense overlapping scales, the alternate intervals with a row of small tufts of short erect scales, and a short tufted ridge at the base of interval 3. *Legs* whitish, the femora with a black patch at the middle and at the apex, the tibiae with the basal half black; the femora not sulcate beneath and all edentate. *Underside* with dense scaling entirely concealing the punctures.

Length 2.5-3.7 mm., *breadth* 1.1-1.5 mm.

QUEENSLAND: Imbil, 2 ♂♂, 8 ♀♀, bred from hoop pine (*Araucaria cunninghamii*), viii-xi.1936 (*A. R. Brimblecombe*).

A very distinct species on account of its striking coloration and the absence of deep foveae on the pronotum.

COSSONINAE.

Stereoderus lucens sp. n.

♀. Uniform shiny black, with the antennae and tarsi red-brown.

Head shiny, with small separated punctures, an indistinct abbreviated median stria, and two very small approximated granules near its anterior margin. *Rostrum* transverse, subparallel-sided, almost symmetrical, but the right side a little longer than the left, the punctures like those on the forehead but more dense; the genae fringed beneath with moderately long dense whitish hairs. *Prothorax* longer than broad, scarcely rounded laterally in the middle, rapidly narrowed at the base, rather abruptly constricted and tubulate at the apex, the constriction continued very shallowly across the disk; the dorsum with distinct separated punctures which are somewhat denser anteriorly, and an impunctate median stripe on the basal two-thirds. *Scutellum* subquadrate, impunctate. *Elytra* with the five dorsal rows of punctures striate only near the base, the punctures not or only slightly diminishing behind, those in row 1 denser than the others; the lateral rows much more finely punctate than the dorsal ones, 9 shallowly and 10 deeply striate on the basal third, 10 broadly interrupted in the middle; the intervals with an irregular row of very fine punctures. *Sternum* with very fine sparse punctures in the middle, which become much larger laterally; mesepimeron not impressed, with a row of punctures.

Length 5.0-5.5 mm., *breadth* 1.4-1.5 mm.

QUEENSLAND: Gadgarra, 3 ♀♀, from a walnut tree, xi.1934 (*J. H. Smith*).

Stereoderus pacificus Woll., from Fiji, is very similar in appearance, but the punctures on the head and prothorax are much more sparse; the rostrum has no long dense hairs beneath (even in the ♂) and dorsally it bears a small conical tubercle in the middle of the disk.

The only species previously described from Australia, *S. macleayi* Lea, differs, according to the description, in having the head and rostrum almost impunctate; the rostrum has three small tubercles close to the apical margin and the mouth-parts with long reddish hairs; and the intervals on the elytra are impunctate.

Omeretes gen. n.

Body cylindrical, transversely convex. *Head* more or less shallowly constricted at some distance behind the eyes, which are slightly convex and much shorter than the temples; forehead strongly convex transversely. *Rostrum* about as long as broad, not dilated at the base; scrobes commencing at one-third from the apex, running longitudinally straight up to the eye, then bending sharply downwards close along the anterior margin of the eye, but not continued on the lower surface of the head; mandibles concealed from above when closed. *Antennae* inserted near the base of the rostrum; scape longer than the funicle, gradually clavate, strongly curved, reaching or exceeding the hind margin of the eye; funicle short and stout, joint 1 as long as or longer than broad, the remaining joints strongly transverse; club almost circular in one aspect, much compressed and not wider than the funicle in the other aspect. *Scutellum* distinct, rounded, sloping forwards. *Elytra* not wider than the prothorax, deeply striate, with five dorsal striae reaching the base. *Legs* with the tibiae widening distally, with a stout uncus but a small mucro, the front pair sinuate on the lower edge but without a tooth, excavate on the external face for the reception of the tarsus; tarsi with joint 3 not broader than 2; trochanters of the genotype with a strong seta, but not in the other species. *Sternum* with the prosternal process as wide as a coxa, the mesosternal one wider than a coxa.

Genotype : *Omeretes podocarpi* sp. n.

Having somewhat the facies and convex form of *Eremotes* Woll., which differs in having the scrobes oblique and not angulate; the scape is shorter than the funicle and does not reach the hind margin of the eye; the prosternal and mesosternal processes are both much narrower than their adjoining coxae.

The known species of *Coptus* Woll. are much smaller and flatter insects, but have similar scrobes and antennae; they differ, however, in having the cephalic constriction adjoining the eyes, which are much longer than the temples; the longitudinal part of the scrobes is less than half the length of the rostrum and the vertical part continues backwards beneath the head; the prosternal process is only half the width of a coxa, and the mesosternal one is as wide as a coxa.

Coptus subcarinatus Fst., 1898, should be transferred to this genus.

Omeretes podocarpi sp. n.

Uniform red-brown, with the club of the antennae paler.

Head with strong separated punctures, except on the vertex, which is almost impunctate, not constricted, with a round median fovea behind the eyes, which are a little more convex than the temples. *Rostrum* about as long as broad, subparallel-sided, with close distinct punctures throughout and a shallow median impression near the apex. *Antennae* with the scape reaching the base of the eye. *Prothorax* about as long as broad, rounded laterally in the posterior half, widest at one-third from the base, constricted and subtubulate at the apex, the constriction not continued across the disk, the base not marginate; the dorsum with distinct even punctures separated by about their own width, with a variable abbreviated impunctate median stripe; the pleurae with similar punctures. *Elytra* with deep striae containing strong close punctures; striae 4 and 5 not uniting at their apices, 3 and 6 uniting, 9 and 10 coalescing on a level with the apex of ventrite 1; interval 9 strongly costate on the posterior third, uniting first with 7 and continuing round the apex to join interval 1, so that the true apical margin is invisible from above; the dorsal intervals broader than the striae, with a row of very small spaced punctures. *Underside* with strong dense punctation throughout the venter, the punctures on the metasternum more sparse.

Length 2.5-3.0 mm., *breadth* 0.7-0.8 mm.

QUEENSLAND : Gadgarra, 2 specimens, from *Podocarpus amara*, ii.1932 (*Fielding*); Gadgarra, 10 specimens, from "black pine," iv.1934 (*J. N. Smith*).

Omeretes onychialis sp. n.

Red-brown, with the apical margins of the rostrum and prothorax, and the base and apex of the femora, more or less infuscated.

Head very shallowly constricted half-way between the eyes and the base, with strong separated punctures extending more sparsely on to the vertex; eyes more convex than the temples. *Rostrum* as long as broad, almost parallel-sided, with punctures similar to those on the forehead but more dense, and with a very shallow indefinite longitudinal median impression. *Antennae* with the scape extending well behind the eye. *Prothorax* longer than broad (5 : 4), rounded laterally, widest at one-fifth from the base, gradually narrowed in front, broadly constricted near the apex, the constriction continued very shallowly across the disk, the apex shallowly sinuate in the middle, the base narrowly marginate; the dorsum with rather close but separated punctures which are denser in the subapical constriction, and with an abbreviated smooth median line; the pleurae with much larger shallow punctures. *Elytra* with close deep punctures in the striae, striae 4 and 5, and 7 and 8, uniting at their apices, stria 3 isolated, 10 complete; the dorsal intervals broader

than the striae, with a row of distinct punctures, interval 9 finely carinate on its upper edge behind the middle and costate for a short distance only at its apex, where it unites with 3, the apical margin clearly visible from above. *Legs* with the femora more slender than in the other species, and joint 4 of the tarsi unusually compressed in the basal half, being very narrow when viewed vertically. *Underside* with the metasternum and venter fairly closely and similarly punctate.

Length 3.2-4.5 mm., *breadth* 1.0-1.3 mm.

VICTORIA : Cockatoo Creek, 4 specimens, xii.1936 (*J. C. Goudie*).

The distinctive characters of *O. (Coptus) subcarinatus* Fst., from South India, are as follows:—Head shallowly constricted laterally; rostrum without any dorsal impression; scape reaching hind margin of eye; prothorax with the base marginate; elytra with the dorsal intervals more convex and not broader than the striae, striae 4 and 5 uniting at their apices, 9 and 10 coalescing on a level with the hind coxa; interval 9 not strongly costate, uniting with 7, 3 and 2, the apical margin plainly visible from above; venter less densely punctate than the metasternum.

SOME NEW MACROLININAE (COLEOPTERA : PASSALIDAE)

By W. D. HINCKS, M.P.S., F.R.E.S.

THE new species of PASSALIDAE described below belong to the Indo-Australian subfamily MACROLININAE and have come to my notice in the course of work on collections of Passalid material sent for identification by various museums. In connection with the present contribution I wish to express my thanks to the following who have been kind enough to send specimens for examination—Sir Guy A. K. Marshall (Imperial Institute of Entomology), Mr. M. A. Lieftinck (Zoological Museum, Buitenzorg), and Mr. G. A. Kerrich (University Museum, Cambridge).

Macrolinus puncticollis sp. n.

Antennae with 6-lamellate club; lamellae long and when club is closed their inner margin forms a more or less straight line. *Head*. Anterior margin of labrum straight; inner and outer tubercles (when viewed from above) appear to be close together and situated on the anterior margin of head; if the insect is tilted it will be seen that the inner tubercles are placed above and to the inner side of the outer tubercles; the line between the inner tubercles is slightly concave, and between these tubercles and the outer tubercles there is a narrow perpendicular portion of the head; the frontal area triangular in outline and rather small, uneven and sparingly punctate; depressed areas of head strongly punctate. *Pronotum* with sides and posterior angles with hair-bearing punctures; anterior margin without hair; median groove present but interrupted in

front and behind; disc impunctate. *Elytra* with grooves more strongly punctured laterad; shoulders with tuft of hairs. *Mentum* with median portion impunctate except for one or two isolated punctures; side pieces strongly punctate. *Mesosternum* with strongly punctured scars and hair-bearing punctures at the base mesad. *Metasternum*. Anterior intermediate areas and lateral areas with hair-bearing punctures; disc impunctate; posterior intermediate areas with one or two isolated punctures. *Abdomen*. Lateral scars with hair-bearing punctures; last sternite with a marginal groove on either side uniting mesad with an indistinct longitudinal raised ridge.

Measurements. Length, 26.5 mm.; pronotal length, 5 mm.; width, 6.5 mm.; elytral length, 16.5 mm.; width, 8 mm.

Locality: JAVA: Kawah Kamodja 1600 m. 19.iv.30. *M. A. Lieftinck*.

Type: Unique in Zoological Museum, Buitenzorg.

A distinct species running down with Gravely's table * to his rubric 9 and intermediate between the two sections which fall under it. The small frontal area and large inner tubercles on the one hand ally *M. puncticollis* with *M. depressus* Grav. and *M. batesi* Kuw. whilst the punctured frontal area and more or less straight connecting ridge between the inner tubercles suggest relationship with the *latipennis* group.

Aceraius parvulus sp. n.

Mandibles with the basal upper margin simple, without any distinct tooth or prominence other than a slight convexity at the base. *Antennae* with club composed of three short and three moderately long lamellae. *Head*. Labrum with anterior margin straight; anterior angles of head not prominent; upper surface smooth and shining with hair-bearing punctures behind; outer tubercles long, asymmetrical, the left longer and broader than the right, obliquely truncate distad with the apex a little inclined upwards, the right simple and acute; inner tubercles situated near the base of the outer tubercles and on a level with their inner margin; a straight ridge joins the inner tubercles together; parietal ridges sharp and distinct at apex (type is immature); central tubercle small but distinct; frontal ridges very fine, not connecting with the inner tubercles (probably appearing obsolete in fully coloured examples); frontal area obsolete. *Pronotum* with indistinct and widely incomplete median groove, with hair-bearing punctures laterad. *Elytra* with all grooves finely punctured; ridges 7 and 9 with hair-bearing punctures throughout. *Mesosternum* wrinkled mesad with small linear scars. *Metasternum* with anterior intermediate areas, lateral areas, posterior intermediate areas and hind margins bearing piligerous punctures; disc impunctate. *Abdominal sterna* impunctate.

Length, 26 mm.

Locality: MALAY PENINSULA: Gunong Inas 3-4000 ft. *Skeat*. 30.xi.1899.

Type: Unique in Cambridge Zoological Museum.

With Gravely's table † of the genus *Aceraius* the present form runs down to *A. pilifer* (Perch.) of which I have examined Javanese specimens. *A. parvulus* is evidently very closely allied, but differs in its more slender form, in the absence of any strongly marked upper tooth on the left mandible, and in the different form of the left outer tubercle.

A. pilifer occurs only in Sumatra, Java and Borneo, and the present species probably replaces it in the Malay Peninsula.

Whether the two forms are subspecies of a single species can only be determined by the examination of further Malayan specimens.

* 1918, *Mem. Indian Mus.* 7: 82-83.

† 1918, *Mem. Indian Mus.* 7: 92-93.

***Cetejus lateralis* sp. n.**

A large and rather flattened form for the genus with rather longer antennal lamellae than usual, thus presenting the appearance of a species of *Analaches*, from which it differs, however, in the absence of any distinct angular elevation on the basal upper margin of left mandible.

Shining black with a faint subopalescent sheen of variable extent which is quite distinct on the sides of the elytra.

Antennae with a club composed of three short and three moderately long lamellae. *Head*. Anterior margin of labrum straight; upper surface of head polished and smooth as a rule, sometimes somewhat rugose, impunctate or nearly so; outer tubercles asymmetrical, left broader than the right, truncate at apex and a little inclined inwards; right outer tubercle equal in length to the left but more slender and acute; parietal ridges and central tubercle as a rule not prominent; frontal area and ridges obsolete; inner tubercles prominent and joined by a ridge-like tumidity, about as widely separated from each other as are the outer tubercles; in front of the inner tubercles the frontal ridges are more or less obsolete. *Pronotum* impunctate throughout except sometimes for a few isolated punctures in the lateral grooves; median groove distinct, interrupted before and behind; underside of posterior angles moderately strongly hairy. *Elytra* with shoulders bare; all grooves distinctly though finely punctured. *Mentum* with the secondary scars forming a small semicircular groove; median part impunctate; side pieces with a mixture of large and small punctures. *Mesosternum* impunctate with small, lightly impressed scars. *Metasternum* with the anterior intermediate areas and lateral areas with large hair-bearing punctures; posterior intermediate areas with shallow hairless punctures; disc impunctate. *Abdomen* with impunctate scars; ultimate sternite impunctate and polished without apical groove.

Length, 33–35 mm.

Locality, etc. Type:—S.E. NEW GUINEA: Rawlinson Mts. in Hincks and Dibb Collection. Paratypes:—2 examples BRITISH NEW GUINEA: Owgarra. A. S. Meek (coll. Hincks and Dibb.), 2 examples NEW GUINEA: Bolan Mts. (coll. Hincks and Dibb.), 1 example NEW GUINEA: Finschhafen (coll. Hincks and Dibb.). A paratype will be deposited at the British Museum.

Variation occurs in the series examined in the degree of prominence of the small central tubercle and the parietal ridges, in the smoothness or otherwise of the head surface, in the size of the secondary mentum scars and the proportion of large to small punctures on the side pieces of the mentum. The frontal ridges in front of the inner tubercles vary somewhat in prominence. The Owgarra specimens have quite distinct punctures in the frontal groove.

I know of no species to which the present is closely allied. The genus *Cetejus*, however, is badly in need of revision, and for notes on this subject see my recent paper in 1937, *Nova Guinea* (n.s.) 1: 113.

***Lablenus aberrans* sp. n.**

Antennae with club composed of three short and three moderately long lamellae. *Head* more or less symmetrical; outer tubercles simple, more or less conical and small, left a little longer than the right, apex of both slightly deflected upwards; anterior margin of head between outer tubercles slightly concave; central tubercle very small and inconspicuous; frontal area indistinct, very small; inner tubercles massive, placed close together and inclined upwards, being joined together transversely by a straight ridge; caudal portion of head behind inner tubercles smooth and impunctate; in front of inner tubercles frontal ridges obsolete and head rugose. *Pronotum* transverse, covered with

micropunctures distinctly visible with a $\times 15$ lens; large punctures absent except a few in the scars; lateral and marginal grooves also almost impunctate; underside of posterior angles with moderately long hair; median furrow distinct and complete. *Elytra* apparently lightly fused; puncturation fine, a little stronger laterad than dorsad; sides with faint subopalescent sheen. *Mentum* with secondary scars close together and close to anterior margin, mesad finely punctate, coarsely laterad. *Mesosternum* impunctate with distinct subrugose scars. *Metasternum* with sides, anterior intermediate areas and lateral areas closely punctate and densely hairy; disc and posterior intermediate areas impunctate. *Abdomen* with subrugose scars; ultimate sternite with strong apical tuft of hairs.

Length, 31 mm.

Locality: NORTH NEW GUINEA.

Type: Unique in Zoological Museum, Buitenzorg.

A very distinct species, which, whilst conforming to all the characters of *Labienus*, has the appearance of a *Cetejus*. The massive obliquely elevated inner tubercles will readily distinguish this species from any of the members of its genus.

Gonatas intermedius sp. n.

Very similar to *G. germari* from which it differs in having the antennal lamellae distinctly shorter, the posterior margin of the mentum slightly curved, the scars forming a ω -shaped figure (in *G. germari* the scars are W-shaped). The lateral striae of the elytra are also rather more strongly punctured. *Length*, 27 mm.

Type: ADMIRALTY Is.: Manus 1932 (*N. E. H. Caldwell*) in British Museum (Imperial Institute of Entomology).

In almost all other characters this species is identical with *G. germari*. The form of the mentum, however, places it in a different section from *G. germari* and its allies according to the arrangement adopted by Gravely (1918). This section, characterised by the ω -shaped mentum, contains *minimus* (Kuw.), *altidens* Heller,* *pumilio* (Kaup), *cetioides* Zang† and the present species.

Of these *minimus* and *altidens* have complete dentition, whilst the remainder have that of the left mandible reduced. *G. cetioides* is a more convex form, and *pumilio* is much smaller, so that neither can be confused with *intermedius*.

* 1910, *Abh. zool. Mus. Dresden*, 13 (3): 15-16, t. 1, f. 13. [New Guinea: Toricelli Mts., alt. 900 m.] In the Hincks and Dibb Collection there are two examples from New Guinea: Bolan Mts., and I have seen a third specimen probably belonging to this species from Bougainville I.

† 1905, *Deuts. ent. Z.* 1905: 316 [Patria?]. I have two examples also without locality. Gravely, 1918, *Mem. Indian Mus.* 7: 108 records it from New Britain.

ON THE BRITISH LESTREMIINAE, WITH NOTES ON EXOTIC SPECIES.—I. (DIPTERA, CECIDOMYIIDAE).

By F. W. EDWARDS, F.R.E.S.

THE subfamily LESTREMIINAE has hitherto remained one of the least-known groups of British Diptera, no doubt because the species are small and inconspicuous, while few or none of them are of any economic importance and (in contrast with the CECIDOMYIIDAE) none of them is a gall-maker. I reviewed the British species of the *Lestremia* group in 1929 (*Ent. mon. Mag.*, 65: 9-16), but the more numerous species of the *Campylomyza* group have not till now been studied in Britain; moreover, some errors in my paper of 1929 have become apparent, and additional data accumulated regarding the *Lestremia* group, so that a complete revision of the subfamily in Britain is desirable.

This study could not have been undertaken without a preliminary examination of such types of the European species as still exist. In the spring of this year (1937) I was able, through the kindness of Prof. E. Reichensperger, to examine and, where necessary, dissect the important series of types in the Winnertz collection in Bonn University. Monsieur E. Ségué allowed me to examine the material in the Meigen collection in Paris; Abt L. Czerny sent me some types from the Strobl collection in Admont, and Dr. G. Enderlein sent for study the specimens named by Kieffer in the Rübsaamen collection in the Berlin Zoological Museum; these last were unfortunately few in number. I am therefore now in a position to redefine most of the species described by the older authors, but it appears that for most of Kieffer's species no types exist. I took the opportunity afforded by a visit to western Germany in May 1937 to visit Bitcher, Kieffer's home town, where I discussed the point with the Abbé Fourer, head of the College, and Monsieur V. Schmitt, Kieffer's successor as professor of natural science. They could only confirm what I had already understood to be the case, namely, that Kieffer not only did not make types, but was not even interested in forming a collection: in the case of material collected by himself he usually destroyed the specimens after describing them; specimens sent him by others were returned to the senders. There are at any rate no named CECIDOMYIIDAE among the materials left by Kieffer, and the most that can be hoped for is that an examination of his papers, which is to be undertaken by Monsieur Nominé, may reveal unpublished notes and drawings.

The British material examined consists largely of adult specimens captured by myself, chiefly during the last two years, either on windows or in woods and about old logs. In addition to my own captures, the fairly extensive collections of the late Mr. F. Jenkinson in the Cambridge Museum, and of Messrs. K. Britten and A. H. Hamm, have been placed at my disposal, and I have also been able to examine the LESTREMIINAE in the collection of Dr. H. F. Barnes. As a result the total number of British species of the subfamily now known to me is over 50 (as against 19 noted in a manuscript list of British CECIDOMYIIDAE compiled by Dr. H. F. Barnes in 1935), and it is certain that this number will be considerably augmented in the future.

TECHNIQUE.

My specimens have either been collected in alcohol, or pinned in the field when freshly killed; slide mounts are usually necessary for determination, but it is very desirable whenever possible to preserve some specimens dry, as various features of colour, pubescence, etc., are inevitably lost in mounting, and, moreover, the fainter veins of the wing are easily seen in the dry specimen, whereas they may become almost invisible in a mounted wing unless it has been well stained. I find that much the easiest and best mountant to use is De Faure's chloral-hydrate gum (Flatters and Garnett); specimens can be transferred directly from spirit to this gum. It is perhaps best to place the slide in a warm oven for a few hours immediately after mounting, but this is not essential; nor is it necessary to ring the coverslip with cement, as the gum will set within a few weeks even without warming. Care should be taken to use only a sufficient amount of gum to allow for the considerable shrinkage which takes place; it is also desirable, while the specimen is still in spirit, to remove one or both wings, the tip of the abdomen, and perhaps the head, and mount these parts under separate small coverslips; wings must be mounted as flat as possible, but, in mounting genitalia, pressure should be avoided. Specimens which have been pinned can be mounted in the gum almost as readily as those which have been collected in alcohol, and with almost equally good results; it is only necessary first to soften them by placing them for a few minutes in a mixture of caustic potash and spirit (cold) and then wash them in plain spirit (not water).

As noted above, it is sometimes necessary to stain wings in order to show up the fainter veins. For this purpose the wings should be removed from the specimen and placed in a solution of carbol-fuchsin in glacial acetic acid; after being left in this stain for 24–48 hours they may be transferred directly to clove oil and mounted in balsam. Stained balsam preparations of the head and male genitalia can be prepared in a similar way, except that the specimen must first be cleared in caustic potash which is just brought to boiling point; such specimens do not take nearly so long to stain as do the wings (an hour or less will suffice). The structure of the eyes is much more readily seen in a cleared balsam mount than in a gum mount, as the gum does not clear the pigment.

For examination and dissection I use a binocular microscope with 32 mm. objective and No. 4 or No. 5 eyepiece, giving a magnification of about 100. All but the smaller species of LESTREMIINAE can be identified with the aid of this instrument, but of course a monocular microscope with $\frac{1}{6}$ " objective is necessary to study the finer details of antennal or genitalic structure.

STRUCTURE.

The following remarks on structural characters of the LESTREMIINAE are merely intended to call attention to certain features which have not been fully described by previous writers, and to explain some of the terms used in this series of papers.

Head.

Kieffer and others have given as a character of LESTREMIINAE, distinguishing this subfamily from others of CECIDOMYIIDAE, the presence of three ocelli. I now find that this diagnosis is not quite correct, as the genera *Lestremia*, *Gongromastix* and *Anarete* have only two small ocelli, and in some exotic

species of the last-named genus ocelli are absent. All other genera of the subfamily, as far as I have observed, possess three well-developed ocelli.

The shape of the eyes gives valuable generic indications in several cases, the dorsal extension of each eye ("eye-bridge" of Enderlein, 1911) being narrow in some genera, broad in others, while in *Campylomyza* the dorsal part of each eye is separated from the main portion and united with its fellow, thus producing a "three-eyed" condition.

The sensory structures on the antennae have been much used by Kieffer and Felt for generic distinctions, but as these are largely sexual and their form is so varied they appear to be of more use for specific than for generic differentiation. It is noteworthy that in this subfamily antennal sensoria are much better developed in the females than in the males, the converse being the case in the CECIDOMYIINAE. The general form of the sensoria is constant for any given species and often for a group of related species, but shows some variation according to the part of the antenna on which the structures occur. For the figures of single antennal segments drawn to illustrate the sensory structures of the British species, I have selected a segment near the middle of the antenna. In these figures, for simplification of drawing, only the sensory structures have been shown and the ordinary hairs indicated by their sockets, the size of which is a rough indication of the length of the hair. A useful character for distinguishing some species is the number of hairs comprising the main hair-whorl.

In many groups of CECIDOMYIIDAE the number of palpal segments has been regarded as a feature of generic importance, but this is not often the case in the present subfamily, where in various genera obviously closely-related species, or even in some cases individuals of the same species, may have either three or four palpal segments. Where the number of palpal segments is fewer than three the species concerned have been treated as generically distinct from the others, but it appears questionable whether any genera in this subfamily should be separated on such grounds alone. The vestiture of the palpi is sometimes of importance; it may consist only of hairs or may include many small scales.

Thorax.

In all genera of the subfamily except *Campylomyza* and its relatives, the vestiture of the mesonotum is confined to the sides and to a pair of dorsal stripes convergent behind, bearing the dorso-central hairs; in the genera of the *Campylomyza* group, however, the mesonotum has a more or less uniform covering of short hairs, which may be sparse or dense. The pleura is always bare.

Legs.

Kieffer made considerable use of the form of the claws, particularly the presence or absence of minute serrations or lateral striations, or subapical thickenings of the claws, in diagnosing the genera of this subfamily. I have not used these features for generic diagnosis because I find the characters difficult to appreciate, and it would seem that the apparent differences may in some cases be due merely to differences of orientation. On the other hand, the form of the empodium, as pointed out by Kieffer, is undoubtedly of much taxonomic value. I find also that the vestiture of the legs is of importance. In *Lestremia* the short pubescence of the tarsi consists of flattened hairs or very narrow scales which are all of similar length and all straight; in the

Campylomyza group the tarsal vestiture is of two lengths, the longer consisting of simple hairs, the shorter of simple hairs in some genera and of distinct, blunt-tipped scales in others.

Wings.

The venation of the wings provides characters of great importance for classification. In addition to more obvious features, such as the condition of the media and cubitus, which have been used for generic definition, I find that (especially in *Campylomyzini*) many minor features, such as the relative lengths of *R*1 and of the base of *R*s (the apparent cross-vein), the degree of obliquity of the latter, the angle subtended by the cubital fork, and the length of *Cu*2, are valuable for specific and even generic differentiation.

The Comstock-Needham system of notation is used here, and needs no explanation beyond the lettering on fig. 1, a and f; for convenience and brevity I use the symbol *R*s to indicate only the short basal portion of the radial sector, and *R*5 for the main portion beyond the junction with *r-m*. The vein *CuP* (posterior cubitus of Tillyard, 1936), a short concave vein lying immediately beneath the basal part of *Cu*, has not been referred to by previous writers on this family; it is only of interest because it provides one of the tribal features of *Campylomyzini* and *Strobliellini*, where it is fused distally with *Cu* instead of ending free as usual.

On certain of the main veins of the wing are to be found minute *pores*, the presence of which on wing-veins of *CECIDOMYIIDAE* was first noted by Collin in 1914 in certain African species. These pores are not always easy to see but can usually be detected in a gum or balsam mount by careful examination under the high power of the binocular, or in any case with the $\frac{1}{8}$ " objective; they must not be confused with the sockets of hairs. I find that the positions of these pores sometimes provide useful indications of affinity in the *Campylomyzini*; in that tribe there are always three towards the tip of *R*1, and two or three, which vary in position, on *R*5 and *rm*; in the *Lestremiini* (fig. 1, f) the arrangement is quite different.

The hairs on the wing-membrane and veins are of two kinds, as in most *Nematocera*: very small *microtrichia* evenly distributed over the whole wing and larger and less numerous *macrotrichia* which differ from *microtrichia* in being easily broken off and provided with distinct sockets (which can be seen even when the hairs themselves are lost). The distribution and density of the *macrotrichia* often provide good generic and specific characters.

Genitalia.

I have paid particular attention to the male genitalia and to the female spermathecae, which have not hitherto been studied in detail in this group of flies, though providing excellent diagnostic characters for the separation of species and genera. The characteristic type of each genus is fully described in the sequel, but a general explanatory account of the male genitalia of *CECIDOMYIIDAE* is perhaps desirable here as the structures have never been described fully by other students of the group. As in all other *Nematoceros* *Diptera* the male hypopygium ("genitalia") consists of four parts: (1) ninth abdominal segment; (2) appendages of ninth segment—forceps or claspers; (3) tenth segment—anal segment or proctiger; and (4) sclerotisations connected with genital opening—true genitalia or aedeagus. These parts are shown with explanatory lettering in fig. 1, l-t.

(1) *Ninth segment*.—The tergite (9t) is variously developed in different

genera, its condition providing generic characters of importance in many cases. There is no separate ninth sternite in LESTREMIINAE or indeed in any CECIDOMYIIDAE.

(2) *Forceps*.—Each arm of the forceps consists of a large basal segment or *coxite* (*cx*) and a smaller distal segment or *style* (*st*). The two coxites are united midventrally at their bases to a variable extent; in some cases (as in *Campylomyza*) this union of the coxites is almost complete; the two being separated merely by a small emargination, and in this condition I have called the whole structure the *sternocoxite*. In the absence of a separate sternite and the fusion or at least the incomplete separation of the coxites, the CECIDOMYIIDAE resemble the BIBIONIDAE, MYCETOPHILIDAE and BLEPHAROCERIDAE, and differ from other families of Nematocera such as TIPULIDAE and CULICIDAE; this is one of the many features indicating that the relationships of the CECIDOMYIIDAE are with the MYCETOPHILIDAE and BIBIONIDAE. In many CECIDOMYIIDAE where the coxites are largely separate they may show more or less conspicuous basal lobes, but I have not observed such lobes in LESTREMIINAE; on the other hand, the tip of each coxite may be produced into a lobe. The style is of various shapes and may or may not have a terminal articulated spine. Each coxite has a sclerotised *root* (*rc*) which passes inwards beneath the anal segment and is connected with the base of the tenth sternite and with the base of the dorsal wall of the aedeagus; these roots provide taxonomic characters of considerable importance; they may end freely, or (as in *Campylomyzini*) they may unite with one another to form a more or less semicircular loop, the median portion of which may be widened.

(3) *Anal segment*. This comprises a *tergite* (10*t*) to which are attached a pair of *cerci* (these structures together forming the dorsal plate of Kieffer), and a *sternite* (10*s*) (ventral plate of Kieffer) which may be a single piece or may be divided into a pair of narrow sclerotised strips; in either case the sternite is covered with fine pubescence except towards its base; as just noted it is connected at the base with the roots of the coxites. The anal segment in CECIDOMYIIDAE is separated from the ninth tergite by a rather wider area of membrane than is usual in Nematocera (consequently the ninth tergite has not always been recognised as a distinct structure forming part of the hypopygium in this family). In its primitive condition (as in the SCIARINAE, the genera *Lestremia* and *Anarete*, and most of the subfamily CECIDOMYIINAE) the anal segment is fairly large and conspicuous, but in the Catochini and *Campylomyzini* and the genus *Gongromastix* it is small and hidden beneath the ninth tergite.

(4) *Aedeagus*. In the CECIDOMYIIDAE the aedeagus usually takes the form of a simple sclerotised tube (more or less incomplete ventrally) which surrounds the distal part of the male genital duct; this was termed by Kieffer the "stylet," and corresponds to the part which in various recent papers I have called the *tegmen* or penis-sheath. In the LESTREMIINAE two distinct parts of the aedeagus may usually be recognised: a dorsal plate or *tegmen* (*t*) lying immediately beneath the tenth sternite, and a rod-like structure, the *genital rod* (*gr*) lying more or less free beneath the tegmen (but inside the ventral body-wall). So far as I have been able to make out, this rod does not contain a duct but is solid and probably represents the apodeme of the vesica, the vesica itself in this subfamily (in contrast with the TIPULIDAE, SCATOPSIDAE, etc.) not being distinguishable as such. The clue to the homology of the genital rod is apparently to be found in the genus *Campylomyza*, where in gum mounts a pair of pale tubes can often be seen lying one on each side of

the rod and attached to its capitate tip; if I am not mistaken these two tubes are the efferent ducts from the testes. At the tip of the genital rod, that is, at the actual genital opening, there are often specialised minute teeth or other structures. The rod itself is sometimes absent. In *Campylomyza* paired sclerotised structures arise from the base of the tegmen and perhaps correspond with the *parameres* of other Nematocera, though they are not definitely articulated as true *parameres* should be.

In the female the most important abdominal structures for taxonomic purposes are the spermathecae; it is remarkable that these structures do not appear to have been mentioned by any previous worker on this family of flies, one reason for this perhaps being that they can only be seen distinctly in well-cleared mounted specimens. I find that sclerotised spermathecae are absent in *Lestremia* and *Anarete*, but present (though very variable in form) in other genera of LESTREMIINAE. Dr. H. F. Barnes informs me that they are absent in the CECIDOMYIINAE, and this fact, together with some others (such as the well-developed anal segment of the male, and the tendency to reduction of the ocelli of *Lestremia*), shows that *Lestremia* may be nearer to the CECIDOMYIINAE than is *Campylomyza*.

CLASSIFICATION.

As the LESTREMIINAE as a whole were grouped by Enderlein (1911) with the SCIARINAE and SCATOPSIDAE, and as the genus *Anarete* has sometimes been placed in the SCATOPSIDAE, while two apparently Scatopsid genera have been included by Felt in the LESTREMIINAE and a species of *Lestremia* has been described by Malloch in the Sciarine genus *Zygoneura*, it may be as well to call attention to the more obvious distinctions between the three groups, which are as follows :—

LESTREMIINAE: Antennae with verticils (even if short). Eyes always bare. Thorax usually with distinct dorso-central rows of hairs. Abdomen of ♂ with eighth segment well developed; hypopygium of simple type, no vesica. Tibiae slender, without spurs. Wings with *Cu1* never quite reaching base of wing.

SCATOPSIDAE: Antennae without verticils. Eyes always hairy. Thorax with pubescence only, no distinguishable dorso-central hairs. Abdomen of ♂ with eighth segment atrophied, hypopygium complex, with large vesica. Tibiae distinctly widened from base to tip, without spurs. Wings (at least in subfamily SCATOPSINAE) with *Cu1* quite separate from *Cu2* and reaching base.

SCIARINAE: Antennae without verticils (though the pubescence may be lengthened). Eyes usually hairy. Thorax always with distinct dorso-central hairs. Abdomen of ♂ of primitive type as in LESTREMIINAE, no vesica. Tibiae slender, spurred. Wings with *Cu1* rising from *Cu2* near base of wing.

Kieffer and Felt divided the LESTREMIINAE into three tribes, according to the condition of the median and cubital veins: *Lestremiariae* with forked media; *Strobliellariae* with simple media and cubitus forked near base; and *Campylomyzariae*, with simple media and cubitus forked near middle. I would also recognise these tribes, but differ from Kieffer in removing *Catocha* (together with *Catarete*) from the company of *Lestremia* and forming another tribe for it. The main characters of the three tribes as I would define them are indicated in the following key:

1. Ocelli two (often very small and occasionally absent); scutellum small; female without sclerotised spermathecae; wings with *Rs* short, more or less obliterated; *R5* running close to costa and ending far before wing-tip; costa ending abruptly at tip of *R5*; *M* with long fork, longer than its stem, one or both branches thick; *An* present (though incomplete); humeral cross-vein present; *CuP* free Lestremiini.
- Ocelli three; scutellum large; female with sclerotised spermathecae; wings with *Rs* always distinct, transverse or oblique; *R5* far removed from costa and nearly or quite reaching wing-tip; costa usually extending well beyond tip of *R5*; *M* thin throughout and with short fork or none; *An* and humeral cross-vein absent 2.
2. *Cu1* free; *CuP* free (but short and indistinct); *M* with or without short fork Catochini.
- Cu1* arising from *Cu* near middle of wing; *CuP* fused with *Cu* (only traceable as a distinct vein close to base of wing, thence forming part of the thick stem of the fork); *M* always simple (often faint) Campylomyzini.
- Cu1* free; *CuP* fused with *Cu* as in Campylomyzini; *M* simple Strobliellini.

In compiling the above key I have taken no account of *Tritozyga* Lw. and *Konisomyia* Felt, which are included by Felt in the Lestremiariae; I do not know either of these genera but strongly suspect that they both belong to the family SCATOPSIDAE. I have also excluded from consideration *Catocha americana* Felt and *C. barberi* Felt, which certainly do not belong to the genus *Catocha* and probably not to the tribe Catochini.

Lestremiini.

The genera and species of this group are everywhere few in number. I recognise only two genera as occurring in Britain, both of which seem to be more or less cosmopolitan in distribution. So far as I am aware only one other described recent genus (*Gongromastix* Enderlein, 1936) is correctly referable here; a re-description of it follows the account of the genus *Anarete* in this paper. Little or nothing is known about the life-histories of species of this tribe; they are believed to be largely xylophagous or saprophagous, and probably some of them have been widely distributed by commerce though this has not been established. Dr. H. F. Barnes has recently obtained adults of *L. cinerea* from larvae feeding in the stalks of mushrooms.

The ocelli of *Lestremia* have sometimes been said to be absent, those of *Anarete* three in number; Kieffer indicates three for both genera. Actually, as stated above, there are two small ocelli in all species of the tribe that I have examined, except in an African species of *Anarete*, in which ocelli appear to be absent.

In both *Lestremia* and *Anarete* the pores on the wing-veins have the same arrangement: there are two near the base of *R1*, one at the point where *rm* meets *Rs*, one a little way along *R5*, and three more near the tip of *R5* (two on the upper surface and one on the lower) (figs. 1 f and 2 g). This arrangement is quite different from that of the Campylomyzini.

ON THE BRITISH LESTREMIINAE, WITH NOTES ON EXOTIC SPECIES.—2. (DIPTERA, CECIDOMYIIDAE).

By F. W. EDWARDS, F.R.E.S.

Lestremia Macq.

The characters common to both subgenera which are not also shared by *Anarete* are as follows :—

Eye-bridges three or four facets broad. Antennae of ♂ long, 16-segmented, all flagellar segments except the last with long necks, the swollen portion bearing three hair-whorls, hairs in the basal whorl short, those in the other two long and spreading. Antennae of ♀ 11-segmented, flagellar segments with short necks or none, and only one distinct hair-whorl, placed near the base. Fourth tarsal segment as long as fifth. Empodium in both sexes shorter than claws; claws in both sexes more or less obviously denticulate beneath. Wings with rather long macrotrichia spread more or less densely over most of the surface and along all the veins (except *R*1). Immediately beyond the end of the costa (where *R*5 unites with it) is a narrow interruption of the thickening of the wing-margin. *Rs* short but nearly always distinct, horizontal or not very oblique.

In all the British species the palpi are much longer than they are in *Anarete*, the segments successively increasing in length, the fourth much the longest (fig. 1, g).

Subgenus *Lestremia* Macq., s.str.

Antennae without definite sensoria in either sex, last segment in ♀ constricted near tip, the nipple-like terminal portion bearing a hair-whorl (fig. 1, j). Male styles ending in one or two sharp points, tegmen elongate-conical (fig. 1, l-p). Wings (fig. 1, a-c): Vein *Cu*1 nearly reaching base of wing; branches of median fork practically parallel, lower branch thinner than upper but equally distinct throughout.

I have seen typical examples of this genus from North and South America, West and East Africa, Papua and New Zealand; some specimens are very similar indeed to the European *L. cinerea*, and I should not be surprised if this species proves to be cosmopolitan when better material is available for comparison. Malloch's *Zygoneura fenestrata* belongs here.

L. (L.) cinerea (Macq.) Edw.

C. carnea Lw.?, *L. declinata* Kieff.?, *L. sylvestris* Felt?.

Thorax with slight but obvious greyish dusting. Wings (fig. 1, a) with anal area bluntly right-angled or only slightly obtuse. Branches of median fork almost equally divergent from stem at base, slightly approximated beyond middle. Hypopygium (fig. 1, l-n). Style ending in two teeth, the one on the outer margin smaller than the other; ninth tergite of moderate size; roots of coxites bent inwards and pointed, the points facing one another but not touching.

This is the commonest species; wing-length averaging about 2-3 mm. Loew's description of *Cecidogona carnea* seems to apply sufficiently well to this species; he described the ocelli as absent, but this was doubtless an error as they are present (though small) in all species of *Lestremia* known to me.

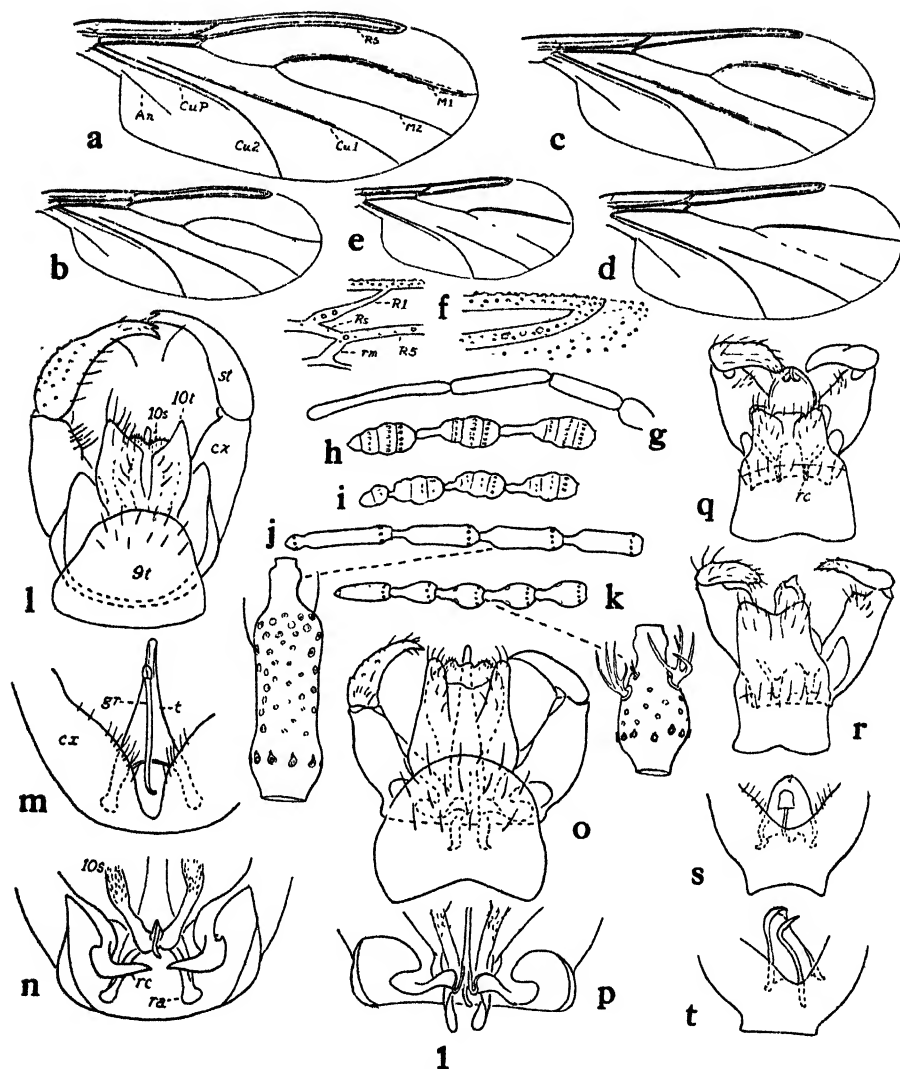


FIG. 1.—British *Lestremia*.—a-e. Outlines of wings (hairs omitted), to same scale; a, *cinerea*; b, *fusca*; c, *leucophaea*; d, *defecta*; e, *strobli*. f, enlarged portions of certain veins showing positions of pores. g. Palp, *cinerea*. h, i. Tip of ♂ antenna: h, *defecta*; i, *strobli*. j, k. Tip of ♀ antenna, with one segment enlarged to show sense-bristles: j, *cinerea*; k, *defecta*. l-t. Male hypopygia: *cinerea* from above (l), beneath (m) and from above with tergite and anal segment removed (n); *leucophaea* from above (o) and with tergite and anal segment removed (p); *defecta* from above (q) and beneath (s); *strobli* from above (r) and beneath (t).

L. (L.) fusca (Mg.) Winn., Edw.

The species which I have determined as *L. fusca* is very similar indeed to *cinerea*; I can find no clear distinction in antennae or genitalia, and it may be nothing more than a smaller, darker form of *cinerea*, the most obvious difference being that the anal area of the wing (fig. 1, b) in *fusca* is more obtuse; wing-length about 2 mm. It is frequently found on windows.

L. (L.) leucophaea (Mg.) Winn., Edw.

This species is amply distinct from *L. cinerea*, differing as follows:—

Antennae with necks of flagellar segments longer. Thorax lighter in colour, mesonotum somewhat shining, without a trace of grey dusting. Wings (fig. 1, c) with lower branch of median fork almost continuing direction of stem, upper branch arched at base, then nearly parallel to lower branch. Hypopygium (fig. 10, p). Style ending in one tooth; ninth tergite much larger than in *cinerea*; roots of coxites turned inwards as in that species, but quite differently shaped.

Not uncommon about old beech trees.

Subgenus **Anaretella** End.

(*Neptunimyia* Felt).

Antennae of ♀ (fig. 1, k) with paired subapical sensoria on each flagellar segment except the last two, each with 4–7 irregular branches; similar sensoria, but with rather fewer branches, present on first 4–5 flagellar segments of ♂; last antennal segment of ♀ entire, not constricted near tip. Male styles without terminal teeth, tegmen broad. Wings (fig. 1, d, e): Vein *Cu1* hardly extending back beyond bend of *Cu2*; branches of median fork evenly divergent almost from base, lower branch faint or obsolete in middle.

This subgenus is also widely distributed. I have seen specimens of species obviously referable to it (though quite distinct from the European species) from Brazil, South Africa and Samoa. The North American *N. tridens* Felt (of which *L. pini* Felt is possibly the male sex) is evidently very similar to *L. defecta*. The African *L. (A.) africana* End., material of which is in the British Museum from the Gold Coast, has much more in common with the subgenus *Lestremia*, especially in venation and antennae; it does, however, agree with *L. defecta* in having the roots of the male coxites directed backwards instead of inwards and to this extent is intermediate between the two subgenera.

L. (A.) defecta Winn.

(*N. bromleyi* Barnes).

Thorax blackish or dark brownish, more or less pruinose. Antennae of ♂ (fig. 1, h) with necks of the flagellar segments fully two-thirds as long as the swollen portion, terminal segment almost as large as penultimate. Venation and hypopygium as shown in figures (fig. 1, q, r). Wing-length about 2.5 mm.

Common. A male in Winnertz's collection in Bonn agrees with British specimens as regards venation, hypopygium and other features; my conclusions as to the inaccuracy of Winnertz's figure of the wing and the synonymy of *bromleyi* with *defecta* are thus confirmed.

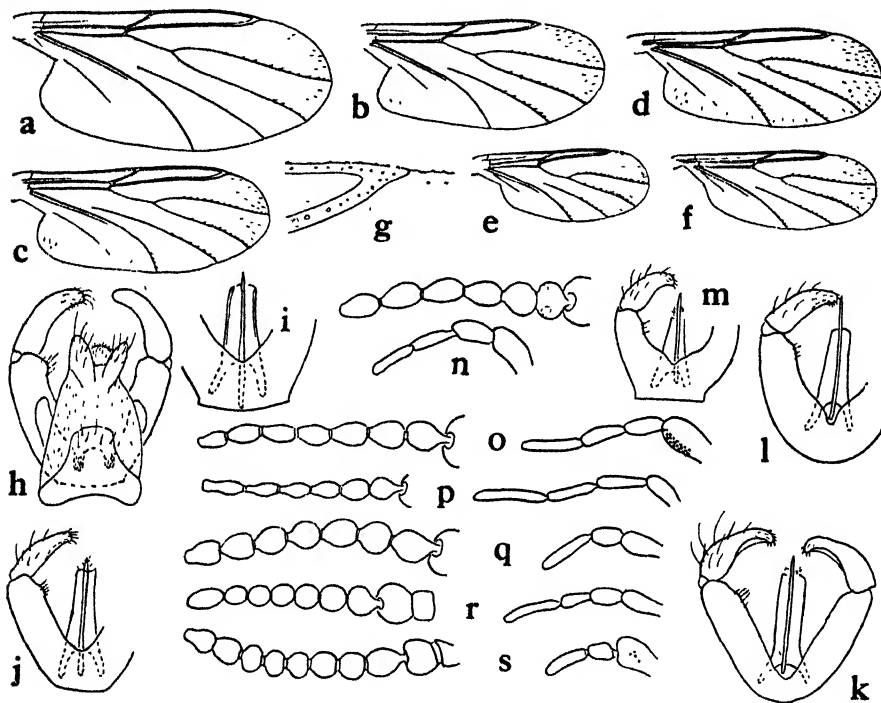
L. (A.) strobli sp. n.

Differs from *L. defecta* as follows:—

Antennae of ♂ (fig. 1, i) with all necks of flagellar segments shorter, only about half as long as the swollen portion; penultimate segment with very short neck; terminal

segment small; verticil hairs less numerous. Hypopygium (fig. 1, r, t). Coxite with subapical enlargement on inner side; style not so broad and more pointed; tegmen narrower and differently shaped at tip; tip of genital rod differently shaped. Wing-length barely 1.5 mm.

Type male taken near Crickhowell, Brecon, ix.1936. I at first thought the specimen might be merely an abnormal *defecta*, but later saw two more male specimens from Strobl's collection, taken at Admont and determined as *defecta*. The Austrian males agree with the Welsh one except that the terminal antennal segment is not so small.



2

FIG. 2.—British *Anarete*.—a-f. Outlines of wings (distribution of macrotrichia on membrane and posterior veins shown); to same scale as fig. 1 (a-e): a, *candidata*; b, *lacteipennis*; c, *heracleana*; d, *coracina*; e, *angusta*; f, *triarthra*. g. Tip of costa enlarged, *candidata*. h, i. Male hypopygium from above and beneath, *candidata*. j-m. Male hypopygia from beneath: j, *lacteipennis*; k, *heracleana*; l, *coracina*; m, *angustata*. n-s. Antenna and palp: n, *candidata* ♂; o, *lacteipennis* ♂; p, *heracleana* ♂; q, *coracina* ♂; r, *angustata* ♂; s, *triarthra* ♀.

Anarete Hal.

The main characters differentiating this genus from *Lestremia* are as follows:—

Eye-bridges narrower, only one or two facets wide, usually narrowed to a point at ocelli. Antennae of ♂ shorter than thorax, with only 8-9 segments, second segment somewhat enlarged, flagellar segments small, without necks and with short verticils only. Antennae of ♀ not quite so short as in ♂, usually 10-segmented, second segment scarcely enlarged, sensory hairs simple. Palpi shorter than in *Lestremia*. Hypopygium (fig. 2,

j-m). Tip of genital rod pointed, unmodified. Empodium in ♂ (except in *A. angustata*) very large, much longer than claws, in ♀ much smaller; claws in ♂ simple or with fine hair-like serrations on distal half, in ♀ quite simple. Wings with short and often very inconspicuous macrotrichia on membrane at tip, with sometimes a few along hind margin; posterior veins at least partly bare. Costa ending less abruptly than in *Lestremia* (fig. 2, g). No trace of a break in the thickening of the wing margin beyond end of costa. *Rs* obliterated.

In addition to the British species, I have examined typical examples of this genus from North America, West and South Africa and Samoa. None of the species shows any striking morphological distinctions from the genotype; I see no grounds for the recognition of subgenera and regard the names *Microcerata* Felt, *Pseudanarete* Kieffer, *Limnopneuma* Enderlein and *Limnopneumella* Enderlein as strict synonyms of *Anarete*.

The habit of the males of flying in swarms in the sun seems to be common to many species of this genus though very unusual in CECIDOMYIIDAE; it has not been observed in *Lestremia*.

A. candidata Hal.

L. albipennis Mg. ?.

The largest species of the genus in Britain (wing-length 2-3 mm.), and distinguished from all the others by the longer legs of the male, the hind basitarsus being 0.65 of the length of the tibia. Antennae 8-segmented in ♂ (fig. 2, n), the last five segments oval, 10-segmented in ♀. Palpi (fig. 2, n) 4-segmented, first not enlarged, fourth not longer than third. Empodium twice as long as claws in ♂, equalling claws in ♀. Wings (fig. 2, a) milk-white, including all veins, hairs at tip few and small, some present on distal half of *M1* and tip of *M2* but none on *Cu1* or *Cu2*; hind margin of wing rounded; *Cu1* not extending back as far as *rm*.

I have examined series of specimens of both sexes taken by Malloch at Bonhill, Dumbarton, and by myself at Waxham, Norfolk, in August; those from the latter locality were taken on the sand-dunes flying in a swarm in the sun.

A. lacteipennis Kieff.

A. crassipalpis Kieff., *A. albipennis* Lw. ?.

Superficially resembles *A. candidata* owing to its milk-white wings, but smaller and with shorter legs; differs from all the other British species in possessing a dense group of short, flattened, sensory bristles on the underside of the first segment of the palpi, this segment being somewhat swollen in ♂ (fig. 2, o) and considerably so in ♀. Antennae in ♂ 9-segmented (fig. 2, o) distal segments rather elongate-oval. Palpi with fourth segment somewhat longer than third. Hind basitarsus in ♂ 0.51 of tibial length. Empodium of ♂ much longer, of ♀ only about half as long as claws. Wings (fig. 2, b) milk-white but with the anterior veins darkened; macrotrichia at tip more numerous and obvious than in *candidata*, present on more than half of *M1*, distal half of *M2* and on tips of *Cu1* and *Cu2*; hind margin straighter than in *candidata*; length 1.7 mm.

CAMBS., BEDS. Mr. J. E. Collin informs me that the series of males taken at Newmarket on 30.viii.1909 were found flying in a swarm in the sun.

A. heracleana sp. n.

Evidently related to *A. lacteipennis*, but differs from that and all the other British species in the longer vein *Cu1*, which is distinctly traceable further back than *rm*. Antennae in ♂ (fig. 2, p) rather more slender than in *candidata* or *lacteipennis*, 8-segmented,

but last segment somewhat constricted in middle (it has the same form in all three specimens mounted, but may perhaps be divided in some specimens); in ♀ 10-segmented as usual. Palpi (fig. 2, p, in ♂; ♀ not mounted) slender and rather longer than in the other species, fourth segment markedly longer than third. Thorax blackish and somewhat shining (rather less so than in *candidata*); dorso-central hairs short, whitish, almost uniserial. Hypopygium of ♂ (fig. 2, k) almost as in *lacteipennis*; tegmen rather longer and narrower than in *candidata* (fig. 2, h, i). Legs light brownish; hind basitarsus of ♂ as in *lacteipennis*, about 0.52 of length of tibia. Empodium as in *lacteipennis*. Wings (fig. 2, c) whitish but not so strongly milky as in *lacteipennis*; anterior veins darkened; shape and trichiation as in *lacteipennis*, venation differing as noted above. Halteres with dark knob as usual. Wing-length about 1.7–2 mm.

HERTS.: Baldock, 8.vii.1933, a series of 15 ♂♂ and 1 ♀ taken feeding on umbels of *Heracleum* and dancing in a swarm in the sun above the flowers.

A. coracina (Zett.) Edw.

A. pilipennis Strobl?.

Differs from the last three species in having the wings (fig. 2, d) greyish, without milky tinge, and with more numerous macrotrichia at the tip and on the veins, *Cu1* being setose almost throughout and *Cu2* as far as the bend; also in having the palpi (fig. 2, q) shorter and only 3-segmented in both sexes, and the antennal segments (fig. 2, q) more rounded. Wings somewhat narrower than in *lacteipennis* and *heracleana*, with rather smaller anal area; length about 1.7 mm.

Of this species I have still only seen the specimens recorded from Bridgwater, Somerset. Confirmation of the identity of these with Zetterstedt's type is needed; the species can hardly be the same as the one figured by Enderlein as *coracina*, because his figure of the wing shows *Cu2* quite bare.

A. angustata Edw.

Differs from the four species described above in its smaller size, dull instead of shining blackish thorax, and much less developed, obtuse anal area of the wing; also in the size of the empodium, which in the ♂ is somewhat shorter than the claws and in the ♀ shorter still. Antennae of ♂ (fig. 2, n) 9-segmented, flagellar segments rounded, of ♀ 10-segmented as usual. Palpi in all ♂♂ examined (fig. 2, r) 4-segmented, first segment not swollen, fourth nearly twice as long as third. Hypopygium of ♂ (fig. 2, m) with the coxites relatively shorter than in the other species, but structure otherwise similar. Hind basitarsus in ♂ barely half as long as tibia (0.49). Wings (fig. 2, e) greyish, whitish at extreme base only; length about 1.3 mm. *M1* and *M2* setose almost throughout, *Cu1* setose almost as far as base of median fork.

About a dozen specimens taken on windows at Letchworth in summer, 1917–37.

In my original description I indicated a remarkable difference in the structure of the palpi between the two sexes, my statements being based on the examination of two similar females, one of which was taken on the same window at about the same time as the type male. However, on 27th August, 1931, I took another female (also on the same window) in which the palpi have quite the same structure as in the male except that the first segment is a little stouter; this female also agrees with the males in the trichiation of the wing and in having segments 6–8 of the antennae rounded and about as long as broad. I therefore now believe that this third specimen is the true female of *A. angustata* and that the other two belong to a different, allied species, described below.

A. triarthra sp. n.

A small species resembling *A. angustata* in having the thorax dull blackish and wings with very obtuse anal area, but differs in the female sex as follows :—

Palpi (fig. 2, s) only three-segmented, first segment much swollen (but with only a small patch of flattened sensory hairs on the inner side, as in *angustata*), second only half as long as first and hardly longer than broad, third a little under three times as long as broad. Antennae (fig. 2, s) with segments 6–8 rather distinctly broader than long; the numerous short pale sensory hairs on distal parts of flagellar segments (such as are present in both sexes of all species of *Anarete*) rather stouter and less pointed. Wings (fig. 2, f) with *R*₁ somewhat longer, extending distinctly beyond level of middle of stem of median fork; macrotrichia on veins less numerous, *M*₂ more or less completely bare on basal half, *Cu*₁ with only a few macrotrichia at tip. *M*₂ seems to be rather thinner than *M*₁, especially in the type (in *angustata* both branches of *M* are equally strong). Wing-length about 1.5 mm.

HERTS.: Letchworth, v.1918, type ♀ (formerly allotype of *angustata*), vi.1917, paratype ♀.

A male *Anarete* from Strobl's collection has palpi similar in form to those of *A. triarthra*, but the thorax is reddish-brown (possibly faded), *M*₁ ends just at instead of above the tip of the wing, *Cu*₁ extends considerably further towards base of wing (as in *A. heracleana*) and the anal area is less obtuse; it is just possible that this is a male of *A. triarthra* though it is more probably a distinct species. The specimen is labelled * “. . . n. sp. nach Kieffer's Brief declinata m.” Kieffer described a *Lestremia declinata* from Strobl's collection in which *M*₁ ends in the wing-tip, but as he could hardly have mistaken an *Anarete* for a *Lestremia* the specimen is presumably wrongly labelled; it might possibly be *A. rubra* Kieff.

Gongromastix End.

This genus was based on *G. andorrana* End., of which a single somewhat damaged male from the Pyrenees was known to the describer. A male in good condition from Strobl's collection, labelled *Lestremia angustipennis* Strobl, which I have examined, agrees so well with Enderlein's figure and brief description that there can be no doubt that the two belong to the same genus. The following generic diagnosis is drawn up from Strobl's specimen :—

Head much as in *Lestremia*: only two small ocelli present; eye-bridges 3–4 facets wide; antennae 16-segmented, all flagellar segments except the last with long necks; palpi (fig. 3, d) long, last segment much the longest. The flagellar segments (fig. 3, c) differ from those of *Lestremia* in having only two complete hair-whorls, a short one near base and a longer one of outstanding hairs near middle; sensory hairs confined to a few short simple hairs on basal segments. Thorax with short dorso-central hairs, acrostichal area bare. Legs much as in *Lestremia*: empodium of moderate size and claws simple. Wings differing from those of *Lestremia* in having the microtrichia coarser but the macrotrichia fine and sparse, almost confined to distal third of wing; costa ending rather less abruptly at tip of *R*₅ and reaching a point well beyond level of tip of *Cu*₁ instead of ending before this level as in *Lestremia*; *R*₁ relatively much longer than in *Lestremia* or *Anarete* (though it is thinned at the tip as in those genera); *M*₂ almost as strong as *M*₁ and distinct throughout. Hypopygium (fig. 3, a) of very different type from that of

* This and other labels on specimens from Strobl's collection are partly in shorthand, for deciphering which I am indebted to Dr. F. Van Emden.

Lestremia or *Anarete* and resembling that of *Catocha* and *Campylomyza* in having the anal segment rudimentary and hidden under the ninth tergite, the coxites separated only by a small median emargination, and the style short and thick.

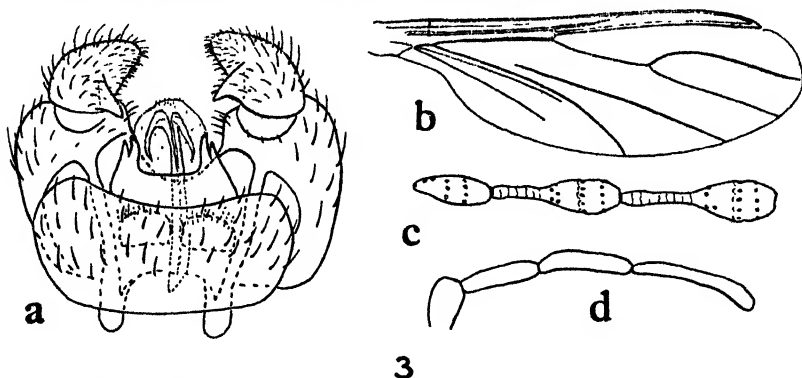


FIG. 3.—*Gongromastix angustipennis* (Strobl) ♂. a, hypopygium from above; b, wing; c, tip of antenna; d, palp.

G. angustipennis has the mesonotum uniformly dull dark greyish; dorso-central hairs short, pale and uniserial; legs and halteres dark. Features of the hypopygium which are probably of specific rather than generic importance are the triangular lobe at the base of the style, the two teeth on each side of the tegmen, and the peculiar structure at the tip of the genital rod. The macrotrichia on the lower half of the wing are much scantier than in Enderlein's figure of *G. andorrana*, there being only two or three in the anal area.

EUROPEAN SAWFLIES OF THE GENUS *XYELA* DALMAN (SENS. LAT.) (HYMENOPTERA SYMPHYTA)

By ROBERT B. BENSON, M.A., F.R.E.S.

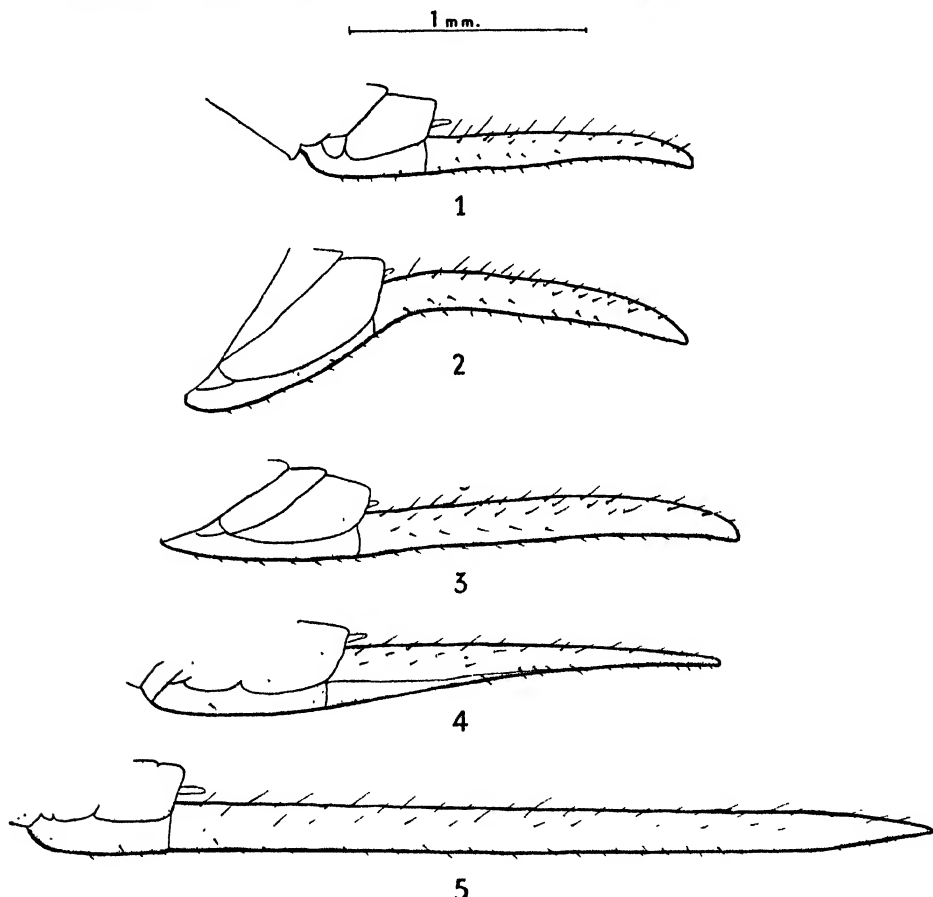
(Department of Entomology, British Museum (Natural History).)

ENSLIN (1917), following Konow (1897), recognised only two European species of *Xyela* in his monograph: *X. longula* Dalman and *X. julii* Bréb., though he expressed some doubt as to whether *X. graeca* J. P. E. F. Stein and *X. alpigena* Strobl were really synonymous with *X. julii* Bréb. Gussakovsky (1935), in his key to the palaearctic species, followed Enslin in recognising only two European species.

While collecting in Switzerland in June, 1935, I caught 3 females of a species of *Xyela* related to *X. julii* Bréb. but clearly distinct from that species. They were swept from *Pinus Cembra* L. at Arolla, at about 6500 feet in Valais; these were later found to agree with the description of *X. alpigena* Strobl, 1895, a species described from a single pair collected from *Pinus Cembra* L. in the Styrian Alps but not found again since then. Konow quotes the reference for this species as volume 15, 1896, instead of 14, 1895, and as all others have likewise misquoted this reference, it would appear that they never consulted the original full description; if they had done so, it could hardly have been interpreted as referring to *X. julii* Bréb.! Unfortunately I have not been

able to examine Strobl's types, but I have little doubt that my Swiss specimens belong to Strobl's species. In Gussakovsky's key they run to *X. kamstchatica* Gussakovsky, 1935, with which *X. alpigena* Strobl is apparently closely related.

More recently I received one of a number of specimens of another *Xyela* species from Algiers; this was sent for determination by Dr. L. Berland of the Museum national d'Histoire naturelle, Paris, and through his kindness retained for the British Museum collection. Dr. Berland (1937) has already published a note on these specimens as "*Xyela julii*"; they were collected from the local *Pinus nigra mauretanica* at Tikhja, 1500 m. in the Djurjura, in February, 1937.



Female saw-sheath from the side in: Figs. 1, *Xyela graeca* J. P. E. F. Stein; 2, *X. curva* sp. n.; 3, *X. julii* (Brébiason); 4, *X. alpigena* (Strobl); 5, *Xyelatana piliserra* (C. G. Thomson).

The species, however, agrees with the short description of *X. graeca* J. P. E. F. Stein (1876). Again I have not been able actually to see the type of this species, which should be in the J. P. E. F. Stein collection at the Zoologisches Museum der Universität, Berlin, but cannot now be traced, as it was never received there with the rest of the collection; for this information I am indebted to Dr. H. Bischoff. Further specimens of this same species collected in Austria and Smyrna, and yet another apparently new species from Austria, have

more recently very kindly been sent to me for examination by Dr. F. Maidl of the Naturhistorisches Museum at Vienna. Probably still other undiscovered species exist in Europe.

For the palaearctic group of species related to *X. longula* Dalman, 1819, it is proposed to erect a new genus. Not having seen any specimens of this group, I wrote to Dr. R. Malaise of the Naturhistoriska Riksmuseum, Stockholm, and he very kindly lent me a pair from Lapland for examination, presenting the female to the British Museum.

Later, single specimens of *X. longula* Dalman were received for examination with other material kindly lent by Dr. Horn of the Deutsches Entomologisches Institut and by Dr. Maidl; these central European specimens have a longer and less pubescent saw-sheath than the Lapland specimen and tend to confirm Thomson's view that two species are indicated. I am indebted to Dr. Kemner at Lund for examining the type of *X. piliserra* C. G. Thomson, 1871, for me.

The larvae of none of the European species of either *Xyela* or *Pleroneura* is yet known. They have often been associated with *Pinus*, as the adults are frequently found on or near these trees but they are also frequently found on the catkins of other trees such as *Betula*. Dyar (1898) has, however, given a brief account of the biology of the North American *X. minor* Dyar, a species closely related to our *X. julii* Brébisson: the larva feeds on pollen in the staminate flowers of pine; it leaves the flowers before they open and drops to the ground, where it forms a deep earthen cell. The larvae of American species of the closely related genera *Megaxyela* and *Macroxyela* feed on the leaves of various trees such as *Carya*, *Juglans* and *Ulmus*; a detailed account of their morphology together with that of *X. minor* Dyar is given in Yuasa (1922).

I use below the length of the female "saw" as a character rather than of the "saw-sheath," because this latter term is ambiguous: sometimes it is used to mean the gonapophyses of the 9th sternite + the oblong plate at the base, both of which ensheath the saw, and at other times to exclude the oblong plate. The length of the saw-blade is, however, approximately the same as the gonapophyses + the oblong plate.

Comparison between Xyela Dalman and Xyelatana gen. n.

For the group of species related to *Xyela longula* Dalman I propose that a new genus be erected differing from *Xyela* as follows.

A. Maxillary palp much enlarged with the three basal segments thicker than segment 3 of the antenna, and segment 3 of the palp clearly longer than the basal segment (scape) of the antenna; ♀ saw at most $1\frac{1}{2}$ times as long as the antenna and much shorter than the whole of the rest of the insect; ♀ saw-sheath (figs. 1-4).

Holarctic. Type: *Pinicola julii* Brébisson, 1818. *Xyela* Dalman, 1819.

B. Basal three segments of maxillary palp less swollen and thinner than segment 3 of antenna, and segment 3 of the palp shorter than the scape of the antenna; ♀ saw about $1\frac{1}{2}$ times as long as the antenna and longer than the whole of the rest of the insect; ♀ saw-sheath (fig. 5).

European. Type: *Xyela longula* Dalman. **Xyelatana** gen. n.

The two species of *Xyelatana* gen. n. may be separated in the female thus:

Saw longer than fore-wing (9.5 : 9). Sweden and central Europe.

longula Dalman, 1819.

Saw shorter than fore-wing (8.7 : 9). Lapland.

piliserra C. G. Thomson, 1871.

Xyela Dalman.

Key to European species ♀♀.

In the females these species are readily separable by the form of the saw-sheath and the length of the antennae. Unfortunately the males cannot be so easily distinguished at present: the differences in the distances apart of the ocelli are less obvious, and it has not been possible to detect any appreciable differences in the genitalia of specimens thought to represent the males of *X. julii* Brébisson, *X. graeca* J. P. E. F. Stein or *X. curva* sp. n. These males, as distinct from their respective females, have the nine apical antennal segments together longer than the three basal ones. In the females this is only so in *X. alpigena* Strobl, of which I have not yet seen a male.

1. POL about $\frac{1}{2}$ OOL; distance between the hind ocelli much less than the distance of one of them from the hind margin of the head (4:6-7); hind femora pale; ♀ saw shorter than the antenna 2.
- POL at least $\frac{3}{4}$ OOL; distance between the hind ocelli about the same or slightly greater than the distance of one of them from the hind margin of the head; hind femora mostly dark brown; ♀ saw longer than antenna.
(The nine apical antennal segments slightly shorter than the three basal ones; ♀ saw-sheath slightly tapering towards the apex and downturned at the extreme tip (fig. 3). There is much variation in this species in the development posteriorly of the antennal furrows, which stretch back from the antennae to encircle the front ocellus. In specimens collected by myself at the same time, some have these furrows very sharply defined, some have them but doubtfully present and others entirely absent behind. Length 2.5 to 3.5 mm. (without saw-sheath).
North and central Europe, Russia, Ural and west Siberia.)
2. Nine apical segments of the antenna together longer than the three basal. ♂♀ *julii* Brébisson, 1818.
♀ saw-sheath not curved down at the apex, but tapering apically, so that at about $\frac{1}{4}$ from the apex it is no broader in profile than when viewed from above (fig. 4).
(Basal nerve of fore-wing almost interstitial with 1st transverse cubital nerve. Length 3.5 mm. (without saw-sheath).
Alps of central Europe (Switzerland and Austria).) ♀ *alpigena* Strobl, 1896.
- Nine apical segments of the antenna together shorter than the three basal; ♀ saw-sheath curved down at apex and only slightly tapering apically, so that at about $\frac{1}{4}$ from the apex it is much broader in profile than when viewed from above (figs. 1 and 2) 3.
3. Saw-sheath almost straight except at the apex (fig. 1); basal nerve received on cubital of fore-wing about half way between the 1st transverse cubital and the costa. Length 2.5 to 2.75 mm. (without saw-sheath).
Mediterranean (Algiers, Greece, Austria and Smyrna).
♂♀ *graeca* J. P. E. F. Stein, 1876.
- Saw-sheath bent downwards strongly in the middle (fig. 2); basal nerve received on cubital of fore-wing at a point much nearer to the 1st transverse cubital than to the costa. Length 3.5 mm. (without saw-sheath).
Austria ♂♀ *curva* sp. n.

Xyela curva sp. n.

♀ *Colour* brown, becoming yellowish-white on the face, the inner orbits above, the pleura, coxae, femora and apical segments of abdomen below; with the following parts more or less black: antennae, groove behind clypeus, antennal and frontal furrows; ocellar and postocellar regions, a stripe between the ocelli and the eye, vertical furrows behind, the hind surface of the head, the mesonotum except for a mark on the hind part of each front lobe, the inner part of side lobe and the middle of the scutellum, the lower edge of the mesopleura, the middle of the mesosternum, the metapleura and saw-sheath. *Wings* slightly yellow; stigma and venation pale yellowish-brown. *Length* 3.5 mm. (without saw-sheath); fore-wing 4.6 mm. *Head* with POL about $\frac{1}{2}$ OOL; distance between hind ocelli less than the distance of one of them from the hind margin of the head; nine apical segments of antenna together slightly shorter than the three basal. *Wings* with basal nerve of fore-wing received on cubital at a point much nearer the 1st transverse cubital than the costa. Saw shorter than antenna; saw-sheath strongly bent downwards in the middle as in fig. 2, with the extreme apex tapering and down-curved.

♂ As in female except for apical segments of abdomen and the fact that the nine apical antennal segments are slightly longer than the three basal ones.

AUSTRIA: Wiessenbach, River Triesting 1 ♀, v.1883 (Holotype) (Kolazy Coll.); Mauer, 4 ♂♂ (including Allotype) 15.iv.1869, 1 ♀ "auf *Betula* Stämmen" 15.v.1869 and 1 ♀ without date (Mann Coll.); River Triesting 3 ♀♀, 1867 and 1 ♀, 1868 (Tschek Coll.); 1 ♀ (Kolazy Coll.); 4 ♀♀ (Ullrich Coll.); 2 ♀♀ (Simony Coll.); 1 ♂, 1 ♀, no data.

All these are labelled "*julii* det. Konow" and, except for 1 ♂ and 4 ♀♀ kindly presented to the British Museum, are all in the Naturhistorisches Museum, Vienna.

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BEITRÄGE ZUR KENNTNIS DER *BEMBIDION*-ARTEN DES FERNEN OSTENS (JAPAN, KOREA, OSTSIBIRIEN) (COLEOPTERA)

1. Mitteilung.

Von Dr. FRITZ NETOLITZKY.

Communicated by H. E. ANDREWES, F.R.E.S.

Bembidion (Plataphus) lucillum Bates.

Beschrieben von Hakone. Ich sah drei übereinstimmende Stücke von diesem Fundorte in der Sammlung des British Museum in London. Diese gehören wegen der einfachen Behorstung der Abdominalsternite und wegen des nicht eingedrückt gerandeten Fortsatzes zwischen den Mittelhüften zur Gruppe des *B. prasinum*, mit dem auch die bis zur Spitze der Flügeldecken reichenden tiefen und fast unpunktierten Furchen übereinstimmen. (vergl. *Wien. ent. Ztg* 1913 : 144). *B. lucillum* gleicht in Bezug auf die Streifung der Flügeldecken und der Färbung auch dem *B. oxyglymma* Bates, das aber wegen der Behorstung der Abdominalsternite in das Subg. *Trichoplataphus* Net. gehört; ausserdem fehlt diesem in den Hinterwinkeln des Halsschildes ein Fältchen und statt dessen ist hier ein erhabenes Feld zu sehen. Neue Fundorte des *B. lucillum*: Tokio, Mitake (Y. Yano), Shikoku, Mt. Ishizuchi (Y. Yano).

Wie mir Herr Andrewes mitteilte und durch Zusendung von Belegen zeigte, stecken in der Sammlung von London unter dem Namen *B. lucillum* Bates noch einige Tiere, aber von anderen Fundorten, die sich vom wahren *B. lucillum* durch deutlichere Punkte in den Streifen der Flügeldecken auszeichnen. Es ist möglich, dass Bates selbst Schuld an der Verwirrung ist, aber wir sind Mangels einer Holotype berechtigt die Wahl dahin zu treffen, dass wir nur die Tiere von Hakone ("Lokotypen") als das richtige *B. lucillum* nehmen und zu *Plataphus* stellen, während das andere Tier zum subg. *Peryphus* gehört und neu zu benennen ist.

Bembidion (Peryphus) pseudolucillum sp. n.

Der Brustfortsatz zwischen den Mittelhüften ist vor der Spitze eingedrückt und daher gerandet; alle äusserlich sichtbaren Merkmale sprechen für die Einordnung in das Subg. *Peryphus* und zwar in die Gruppe des *B. nitidulum* Marsh. in weitem Sinne.

Kopf mit mittelhohen gewölbten Augen und gut abgesetzten Schläfen; Stirnfalten neben den Augen parallel, die sie begrenzenden Innenfurchen tief, der Grund ist polygonal-retikuliert und nur die erhabene Medianlinie zwischen den Augen ist mikroskopisch glatt. *Halsschild* sehr wenig breiter als lang, die Seiten vor den kurz-rechtwinkligen Hinterecken zugeschweift, der abgesetzte Seitenrand (Randkehle) bis zu den Vorderecken deutlich. Das Fältchen in den Hinterecken ist nicht sehr gut sichtbar, verschwindet auch vor der Spitze der Ecken oder ist so gut wie undeutlich. *Halsschildbasis* ohne deutliche Punktierung, aber rauh gekörnelt, die ganze Oberfläche ist mikroskopisch enggenetzt. *Flügeldecken* mit deutlichen Schultern, ihre Streifung und Punktierung erinnern an jene des *B. tibiale* und *B. atrocoeruleum*, doch ist der siebente Streifen deutlich vorhanden. An der Spitze der Decken verbindet sich der erste Streif mit dem zweiten, und der kürzere dritte

mit dem vierten; der fünfte Streifen biegt vor der Spitze nach innen vertieft um und nähert sich dem Ende des verbundenen ersten und zweiten Streifens; der sechste und der siebente Streifen sind die kürzesten. Die Mikroskulptur der Decken besteht aus ungemein engen Querlinien, die sich nicht mehr als Maschen differenzieren lassen.

Färbung: Oberseite dunkel-schwarzblau, Tibien, Tarsen und das erste Fühlerglied pechbraun. *Länge*: 3·5–4·0 mm.

Type und Cotypen (Brit. Mus.) von Settsu, Katsuoji (16.vi.1924., *J. E. A. Lewis*). Ferner von: Chuzenji (*Lewis*); Kashiwagi (*Lewis*); Oudaigahara, Yamato (*Y. Yano*). Ein Exemplar von Chuzenji hat gröbere Punkte in den Flügeldeckenstreifen, dürfte aber doch zu *B. pseudolucillum* gehören.

Die nächstverwandte Art aus dem fernen Osten ist *B. amurense* Motsch., von dem ich typische Exemplare in der Sammlung Moskau zum Vergleiche heranziehen konnte. Es unterscheidet sich von *B. pseudolucillum* durch den stärker herzförmigen Halsschild, der an der Basis deutlich punktiert und auf der Scheibe frei von einer Mikroskulptur ist; dasselbe gilt von dem zwischen den Augen ganz glatten Kopf; ausserdem ist die Basis der Fühler ausgedehnt hell, während bei *B. pseudolucillum* nur das erste Glied bräunlich ist. In Japan kommt eine Rasse des *B. amurense* mit glattem Kopf und Halsschild auch vor, doch fehlt es an Material, um eine genauere Charakteristik geben zu können.

***Bembidion (Plataphus) infuscatipenne* sp. n.**

Ein dem *B. lucillum* Bates ähnliches Tier fand ich in der Coll. Motschulsky in Moskau unter der obigen Benennung von "Sib. orient. Dauria mer." (vergl. *Ges. Luxembg. Naturfr.* 1935 : 23). Die Artbeschreibung hat Motschulsky nicht veröffentlicht, sodass es hiemit geschehen soll, weil für eine künftige Bearbeitung der japanischen Fauna auch die Tiere des asiatischen Festlandes in Betracht gezogen werden müssen.

B. infuscatipenne gehört nach der Gestalt des Fortsatzes der Brust zwischen den Mittelhüften, wegen der einfachen Beborstung der Ventralsternite und der Bildung von Kopf, Halsschild und der Streifung der Flügeldecken zum Subgenus *Plataphus*.

Zum Unterschiede von dem schwarzblauen *B. lucillum* Bates sind die Fühler (besonders das Basalglied), die Palpen und Tibien hell pechbraun, ebenso die ganzen Flügeldecken, obwohl die Tiere durchwegs reif sind. Die Mikroskulptur des dunklen Kopfes und Halsschildes besteht aus Polygonen, die der Elytren aus sehr engen Maschen. Die Elytren sind etwas gewölbter und ovaler gestaltet, die Punktulierung in den bis hinten deutlichen Streifen ist sehr klein und am ähnlichsten jenen bei *B. prasinum*, das aber bedeutend grösser ist und eine Mikroskulptur aus Polygonen auf den Elytren besitzt. Grösse 4 mm.

Type: Wladiwostok, Sib. (*Frieb*, 10.vii.1919) (Coll. Netolitzky); Cotypen ebenso und von Wladiwostok, Usuri mer. (leg. *Dr. Jureček*, ein Ex.); Chitaizki-Sterena, Sib. or. (leg. *B. v. Bodemeyer*, ein Ex.).

***Bembidion (Plataphus) persuasum* sp. n.**

Alle Merkmale, die man am Chitinskelett ablesen kann, stimmen mit denen des Subg. *Plataphus* überein. Das Tier ist ausgezeichnet durch die ganz dunklen Anhangsorgane (Fühler, Palpen und Beine), sodass zum Unterschiede besonders die Verwandten des *B. gebleri* Gebh. in Betracht kommen. Von dieser Art unterscheidet sich *B. persuasum* weniger habituell, als vielmehr durch die sehr feinen, dennoch die Flügeldeckenspitze deutlich und in der gewohnten

Weise erreichenden Streifen; in diesen erkennt man winzige nadelstichartige Pünktchen.

Kopf und Halsschild mikroskopisch vollständig genetzt, die Maschen rechteckig oder polygonal; die Mikroskulptur der Flügeldecken dagegen besteht aus sehr feinen und enggestellten Querlinien, ohne dass eine Maschenbildung zu erkennen wäre, wie dies bei derselben Vergrößerung bei *B. gebleri* (und anscheinend auch bei dem mir nicht sicher bekannten *B. birulai* Popp.) der Fall ist.

Grösse: 4·5–5·0 mm.

Type: Wladiwostok (16.v.1920, *H. Frieb*) (Coll. Netolitzky); Cotypen ebenso (9.vi. u. 9.vii.1919); Ferner: Wladiwostok (*Dr. Jureček*); Nikolsk Usurijsk (*Mandl*); Chitaizki-Sterena, Sib. or. (*B. v. Bodemeyer*); Setschan (Coll. Staudinger); Chingau (unreif) nur je ein Exemplar, die alle etwas grösser sind, als die Tiere von *H. Frieb*, aber sich im übrigen von der Type nicht trennen lassen. Wir brauchen auch dieses Tier zur Klärung der Fauna im fernen Osten, wenn wir über das Festland hinaus nach Japan, Sachalin und die Kurilen blicken wollen.

BOOK NOTICES.

Nederlandsch-Indische Culicinen. By J. BONNE-WEPSTER and S. L. BRUG. Batavia, G. Kolff & Co. (Geneesk. Tijdschrift v. Nederl. Indië **77** (9–10). 1937.) Pp. 105, 45 figs.

This book gives a systematic account of the CULICINAE of the Dutch East Indies. After the introductory matter a key to the species dealt with and description of the genera and species is given. A chapter is devoted to each of the following subjects: Technique of collecting mosquitoes; examination of *Filaria*-carriers; key to genera and to species of *Filaria*-carriers. The book is illustrated with excellent figures and is completed by an index.

A New Subspecies of Plebejus argus (L.). By J. ANTONY THOMPSON. Pp. 6. [n.pl.] [n.d.] Price 9d.

This booklet gives the description of a new subspecies of *P. argus* from Caernarvonshire and, in addition, four varieties of the same insect.

A NEW SPECIES OF *ECHTHROMORPHA* FROM SAMOA

By R. A. CUSHMAN

(Bureau of Entomology and Plant Quarantine, U.S. Department of Agriculture.)

Communicated by Mr. E. P. MUMFORD, F.R.E.S.

THE new species of *Echthromorpha* described below was submitted to me by David T. Fullaway of the Territorial Board of Agriculture and Forestry in Hawaii.

Echthromorpha samoana sp. n.

Similar in form and structure and in the arrangement of the pale markings to *notulatoria* (Fab.), but differs in the red ground colour and in the polished and sparsely punctate abdomen, shorter malar space, absence of the infumate spot at apex of wing, as well as in many minor details.

♀.—Length 15 mm.; antenna 14 mm.

Head polished, face sparsely punctate at sides above, barely broader at level of clypeal foveae than long; malar space only slightly longer than basal width of mandible; junction of occipital and hypostomal carinae about twice the length of malar space from lower articulation of mandible. *Thorax* sparsely punctate dorsally and ventrally, mostly polished laterally; pronotum foveolate along posterior lateral margin; notauli not indicated; scutellum convexly elevated; propodeum polished medially and posteriorly, punctate elsewhere, without trace of apophyses; venation and legs as in *notulatoria* (Fab.). *Abdomen* polished and sparsely punctate; first tergite hardly a half longer than broad; ovipositor depressed throughout, sheath nearly as long as tergites 1-4 combined.

Light mahogany red, darker on head and thorax, especially in frontal scrobes, middle of postvertex, and a median stripe on mesoscutum; yellow as follows: face, clypeus, mouth-parts, entire orbits, malar space, temples, two stripes on mesoscutum (broader anteriorly and extending backward along margins), scutellum, postscutellum, subalar tubercle, prepectus, a large semicircular spot below tubercle and a smaller spot before middle coxa (these two connected by an oblique line), metapleurum posteriorly, propodeum on each side of middle posteriorly, front and middle coxae and trochanters, hind coxa dorsally, and apical margins of tergites 1-6 (interrupted medially on 5-6); apex of abdomen paler red; antennae fuscous, scape and pedicel reddish yellow; wings yellowish hyaline, without infumate spot; ovipositor sheath black.

♂.—Malar space shorter; dark colour of head more extensive; thorax less contrastingly coloured, the red pale and the yellow markings more diffused and more extensive; abdomen paler with at most tergites 1-3 yellow-margined, sometimes uniformly pale testaceous.

Type-locality.—SAMOA: Tutuila.

Type, allotype and paratypes.—No. 52113, U.S. National Museum.

Two ♀♀ (including the type) and 2 ♂♂ (including the allotype) collected ii.-iii., 1930, by D. T. Fullaway and one ♂, H.F.W. No. 13, taken by H. F. Willard at an elevation of 1000 ft. on Tutuila.

ON THE IDENTITY OF *APANTELES CIRCUMSCRIPTUS* NEES (HYM., BRACONIDAE)

By D. S. WILKINSON, F.R.E.S.

(Imperial Institute of Entomology.)

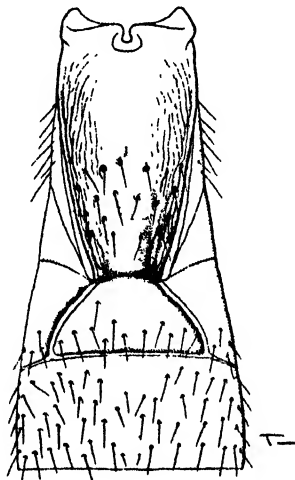
BECAUSE I wish to distribute the material amongst the museums and my various correspondents who have supplied me with examples of this not very common parasite, and because so much synonymy is involved, I came to the conclusion that it would be advisable to publish the result of my work on this species immediately, rather than to wait until the completion of my monograph of the palaearctic species of *Apanteles*, a matter of yet some years. I am aware that the validity of some of the material on which my conclusions are based may be questioned, but despite this I do not think it is necessary at this time to explain at length the sources of all my material, or to give an account of all the old collections scattered about Europe to which I have had access. This matter will be dealt with—more rightly, I believe—in my final work, and it must now be taken for granted that I am not indulging in the practices of most of the earlier writers, and of some of the modern ones too, who seem rarely to have examined the material of their contemporaries or predecessors whom they quoted.

I am much indebted to Mr. W. H. T. Tams, of the British Museum, for some helpful criticism in the matter of the rather complicated synonymy of this species, to Mr. H. Stringer, also of the British Museum, for the modern terminology of the Microlepidopterous hosts, and to Prof. Dr. H. Bischoff, Zoologisches Museum der Universität, Berlin, Mons. A. d'Orchymont, Musée Royal d'Histoire Naturelle, Bruxelles, Prof. Dr. A. Reichensperger, Zoologisches Institut und Museum, Bonn, Mr. A. W. Stelfox, National Museum of Ireland, Dublin, and Prof. Dr. Wolff, Forstliche Hochschule, Eberswalde, for the invaluable assistance they have rendered me in my search for and work on the typical specimens, assistance so valuable that without it I should have been completely at a loss.

Apanteles circumscriptus Nees

- Microgaster bicolor* Nees (nec Curtis), 1834, *Hym. Ichn. aff. Mon.*, 1 : 181. Ratzeburg, 1848, *Ichn. d. Forst.*, 2 : 50–51; 1852, *Ichn. d. Forst.*, 3 : 51. *Apanteles bicolor* Nees, Reinhard, 1881, *Deuts. ent. Z.*, 25 : 48–49. Marshall, 1885, *Trans. ent. Soc. Lond.*, 1885 : 216–217; 1888, *Species Hymén. d'Eur.*, 4 : 479–480 (excl. synn. part.).
- Microgaster circumscriptus* Nees, 1834, *Hym. Ichn. aff. Mon.*, 1 : 181.
- Microgaster umbellatarum* Haliday, 1834, *Ent. Mag.*, 2 : 247–248. *Apanteles umbellatarum* Haliday, Marshall, 1885, *Trans. ent. Soc. Lond.*, 1885 : 220; 1888, *Species Hymén. d'Eur.*, 4 : 483–484. (Syn. n.)
- Microgaster exiguus* Haliday, 1834, *Ent. Mag.*, 2 : 249. *Apanteles exiguus* Haliday, Reinhard, 1881, *Deuts. ent. Z.*, 25 : 48–49.
- Microgaster blancardellae* Bouché, 1834, *Nat. Ins.*, p. 156. Nees, 1834, *Hym. Ichn. aff. Mon.*, 2 : 401. *Apanteles blancardellae* Bouché, Marshall, 1888, *Species Hymén. d'Eur.*, 4 : 490. (Syn. n.)
- Microgaster lividipes* Wesmael, 1837, *Nouv. Mém. Acad. Belg.*, 10 : 63–64.
- Microgaster flavolimbatus* Ratzeburg, 1848, *Ichn. d. Forst.*, 2 : 50; 1852, *Ichn. d. Forst.*, 3 : 51. *Apanteles flavolimbatus* Ratzeburg, Marshall, 1888, *Species Hymén. d'Eur.*, 4 : 491–492. (Syn. n.)
- Apanteles lautellus* Marshall, 1885, *Trans. ent. Soc. Lond.*, 1885 : 219–220; 1888, *Species Hymén. d'Eur.*, 4 : 482–483. Lyle, 1917, *Entomologist*, 50 : 197. (Syn. n.)

♀♂. Colour, particularly of legs and basal segments of abdomen, very variable. Head, flagellum, thorax, 5th and succeeding tergites, apical ventrites, and ovipositor sheaths, invariably black; scape in part or wholly black or red testaceous; 2nd and 3rd tergites occasionally, 1st and 4th very occasionally, red testaceous, otherwise black; tegulae of ♀ invariably red testaceous, of ♂ almost invariably darkened or black; the lateral membranous portions of the basal tergites red testaceous, darkened, or black, as are the front and middle coxae and middle and hind trochanters and trochantines; fore-legs otherwise, middle tibiae and tarsi, and the basal ventrites, entirely red testaceous save very occasionally; middle femora either entirely red testaceous or streaked with black above and below, or entirely black in the basal two-thirds and tipped with red testaceous, or even darkened throughout; hind femora either entirely red testaceous, or entirely black or darkened, sometimes streaked with black above and below, sometimes red testaceous save merely for a black apex; hind coxae either entirely black, entirely red testaceous, or black with the apex or apical third red testaceous; the males more usually, but not invariably, with their legs more darkened than in any female; palpi and tibial spurs pale; wings slightly, or sometimes quite noticeably, infumated evenly throughout, the setae coloured; stigma, metacarp, and wing-veins, light brown, light red-brown, or red testaceous; stigma uniformly opaque.



1

FIG. 1.—*Apanteles circumscriptus* Nees; basal tergites, ♀. × c. 80

♀♂. Very variable in some characters. Head: face throughout with evenly spaced, minute (degree 2) punctation, pruinose in certain lights; facial depressions apparently more or less equidistant from apex of clypeus and the eyes; frontal orbits, frons, and vertex evenly, minutely punctate (degree 1); posterior ocelli about equidistant from each other and the eyes, or nearer to each other than to the eyes; flagellum of ♀ equal in length to or rather longer than combined length of head, thorax, and abdomen, of ♂ about equal to combined length of thorax and abdomen together with three times the length of the head. Thorax: mesonotum and disc of scutellum pruinose throughout, with evenly and rather closely placed, minute punctation (degree 2); propodeon rather variable in strength of sculpture, commonly smooth with only some indefinite striation and punctation, as commonly with a definite, even broad \vee of aciculation and striation stretching up from the lunule and with its tips about at middle of each lateral half of base, where is some punctation, and in more strongly sculptured examples there is transverse striation and aciculation between

the arms of the ∇ and throughout the basal half of the propodeon, but the apical angles almost invariably entirely smooth and shining. *Wings*: transverse cubital equal to or even longer than 1st abscissa of radial, their point of junction either distinct, more or less distinct, or entirely indeterminable. *Legs*: hind coxae dully shining, more usually with a group of fairly strong (degree 3-4) punctures basally above, otherwise in upper half with widely, even sparsely, placed minute punctation; the longer hind tibial spur half, and the shorter spur one-third, the length of the basal segment of the hind tarsus. *Abdomen* (figs. 1 & 2): 1st tergite basally slightly excavated, apically turned over, sometimes entirely smooth, but commonly with well marked longitudinal aciculation down the lateral margins and in the apical half in addition to scattered punctures (degree 3), such aciculation sometimes occupying most or even the whole of the tergite; 2nd tergite more usually smooth and with

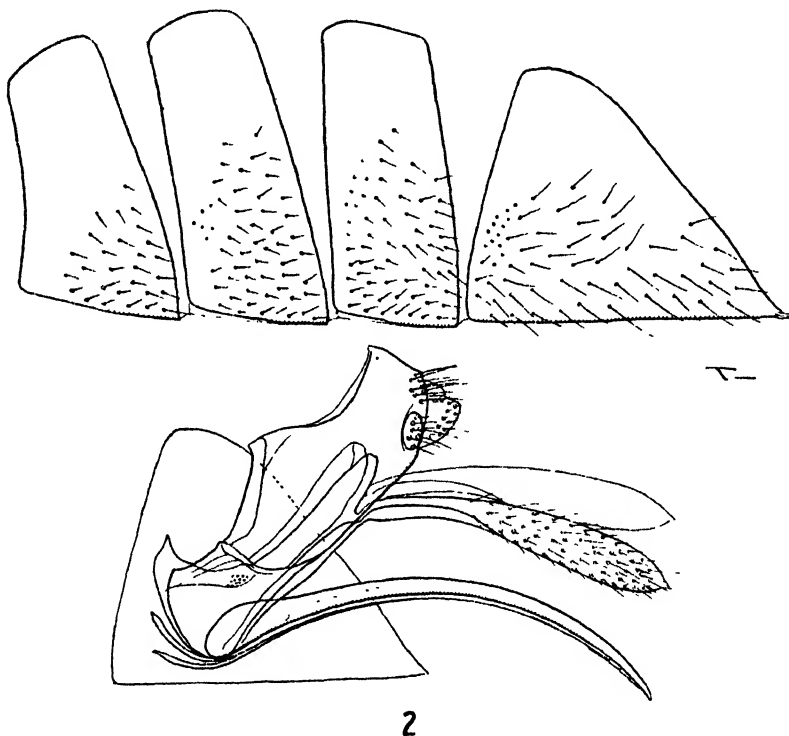


FIG. 2.—*Apanteles circumscriptus* Nees; apical ventrites and, below, genitalia, side view, ♀. × c. 80.

a few minute punctures and some indefinite aciculation, its discal sulci more usually straight but quite often turned down just before apex or even at about their middle, even occasionally rounded throughout; 3rd tergite minutely punctate save for a median basal triangular area; succeeding tergites minutely punctate; ♀ with ventrite no. 2 apparently with median longitudinal suture, and with ventrites nos. 3, 4, 5, apparently with broad median longitudinal suturing in or even throughout their basal halves; ovipositor sheaths about equal in length to the basal segment of the hind tarsus, the ovipositor strong, strongly and regularly decurved, rather longer than the hind femur, rather shorter than the combined length of the three basal segments of the hind tarsus; hypopygium acute, but not membranously so, definitely without median longitudinal suture.

Length, 2.0-3.0 mm.

Redescribed from the following material:—BRITISH MUSEUM: Marshall collection—a card of three (3 ♀♀), labelled *lautellus* Marsh. (one now *type* of *lautellus*); 1 ♀, det. *umbellatarum*; 1 ♀, May 25th (J.H.W.); 1 ♀, 1 ♂, “Niton,” 2 ♂♂, “N,” 1 ♂, “N,” 2.ix.1884, 1 ♀, “Bfmg,” det. Marshall as *bicolor*. Lyle collection—Lymington, 2 ♀♀, ser. nos. 2807, 2808, 10–20.x.1915, 2 ♀♀, ser. nos. 2809, 2810, 20.x.1915, New Forest, 1 ♀, ser. no. 2819, 1.xi.1915, 1 ♀, ser. no. 2820, xi.1915, Halstead, Kent, 1 ♀, ser. no. 4968, 1925, all det. Lyle as *lautellus*. General accessions—Whittinghame, Haddington, 3 ♀♀, 1914 (*Miss A. Balfour*), B.M. Reg. no. 1916–90, det. Lyle as *lautellus*, Whittinghame, 1 ♀, 15.ix.1915 (*Miss A. Balfour*), det. Waterston as *lautellus*. NATIONAL MUSEUM OF IRELAND, DUBLIN: Haliday collection, 1 ♀, no. 74 (*type* of *umbellatarum* Hal.). PLYMOUTH MUSEUM: Bignell collection: 1 ♀, Bign. reg. no. 3223, in register dated 6.viii.1886 (*T. H. Wood*); a card of two (2 ♀♀), Bign. reg. no. 3631, 24.x.1887 (*Bower*), det. as *bicolor*; 1 ♀, 8.vii.1885, det. as *nothus*. NORWICH CASTLE MUSEUM: Bridgman collection: a card of six (4 ♀♀, 2 ♂♂), and 2 ♀♀, Bridg. reg. no. 861, in register dated 20.vi.1887, Steyning (*W. H. B. Fletcher*), det. as *bicolor*; 1 ♀, reg. no. 892, in register dated 1.viii.1887, Gunton; 3 ♀♀, reg. no. 1154, in register recorded from E. A. Atmore, det. as *bicolor*; 1 ♀, reg. no. 571, in register dated 1885, Sunderland (*A. F. Griffiths*), det. as *umbellatarum*. HARWOOD COLLECTION: 1 ♀, det. as *bicolor*. OXFORD UNIVERSITY MUSEUM: Oxford, 1 ♀, em. iii.1923 (*E.J.R.W.*); Shotover, 1 ♀, coll. 21.x.1923, em. 1.i.1924, 1 ♀, coll. 21.xii.1924, em. 23.i.1925, Hailey, Oxon, 1 ♀, coll. 30.x.1927, em. 26.i.1928, 1 ♀, coll. 30.x.1927, em. 2.ii.1928 (*E. G. Waters*). DEPARTMENT OF ZOOLOGY, CAMBRIDGE UNIVERSITY: Cambridge, 6 ♀♀, 1.iv.1936, 2.iv.1936, 4.iv.1936, ser. no. 382 (*Salt*). ZOOLOGISCHES MUSEUM DER UNIVERSITÄT, BERLIN: Berlin-Frohnau, 2 ♀♀, 30.vii.1926, no. 2968, 1 ♀, 12.xi.1926, no. 3037, 2 ♀♀, 13 & 15.ii.1927, no. 3058, 3 ♀♀, 13.i.1928, no. 3287, 1 ♀, 13.ii.1927 (*O. & M. Hering*), Berlin-Finkenkg, 3 ♀♀, 8.v.1929 (*Hering*), Prerow (Darss), 1 ♀, 15.viii.1926, no. 2973/88 (*O. Hering*); Potsdam, 1 ♀, 1 ♀, lep. cat. no. 71791 (*C. Hinneberg*). R. ISTITUTO DI ENTOMOLOGIA, BOLOGNA: Ronzano, Bologna, 2 ♀♀, 1 & 7.v.1933. NATURHISTORISCHES MUSEUM, WIEN: Wien, 1 ♀, iii.–x. 1919 (*Dr. Fahringer*), det. as *laetus* Marsh.; Böhmeikirchen, Austria, 1 ♂, 1922 (*Dr. Fahringer*), det. Fahringer as *fraternus* Reinh. UNIVERSITETETS ZOOLOGISKE MUSEUM, COPENHAGEN: Denmark, a card of seven (7 ♀♀), 16.xi.1924, a card of three (3 ♀♀), 26.v.1925, a card of two (2 ♀♀), 23.iv.1926 (*C. S. Larsen*); 1 ♀, 1.xi.1876, Charlottenlund, 2 ♀♀, 23.ix.1877, 3.x.1878 (*R. W. Schlick*). A. C. W. WAGNER'S COLLECTION: Blankensee, 5 ♀♀, 1902, ser. no. 319, det. as *fraternus* Reinh.; Eutin, 1 ♀, 22.viii.1919, ser. no. 27. D. S. WILKINSON'S COLLECTION: England, Surrey, Box Hill, 5 ♀♀, x.1936–25.v.1937, no. RF9, Dorking, 19 ♀♀, 27 ♂♂, 31.vii.–27.viii.1937, no. RF61, Coulsdon, 9 ♀♀, 7 ♂♂, coll. 4.ix.1937, em. 16.ix.–10.x.1937, no. RF74 (*R. L. E. Ford*). IMPERIAL INSTITUTE OF ENTOMOLOGY: Germany, Saxony, 5 ♀♀, 3 ♂♂, ser. no. 280, 2 ♀♀, 1 ♂, ser. no. 279, 1 ♀, ser. no. 282, 3 ♀♀, ser. no. 283, 1 ♀, ser. no. 260 (*Herr Schutze, per Dr. A. Roman*); England, Berkshire, 1 ♀, 19.viii.1925 (*per O. W. Richards*), det. as *lautellus*.

Further material examined:—BOUCHÉ COLLECTION: 1 ♀ (*type* of *blancardellae*). WESMAEL COLLECTION: 2 ♀♀, 3 ♂♂, mus. ser. no. 2017 (*type-series* of *lividipes*). RATZBURG COLLECTION: 1 ♀, ser. no. 342 (*type* of *flavolimbatus*), and 1 ♂, ser. no. 296; 1 ♀, ser. no. 237 (now *neotype* of *bicolor*), 2 ♀♀, 1 ♂, ser. nos. 298, 322, det. Ratzeburg as *bicolor*. REINHARD COLLECTION: 9 ♀♀ (one now *neotype* of *circumscriptus*), 3 ♂♂, mus. ser. nos. 26977, 26978, det. as *bicolor*.

Type of *M. bicolor* Nees, lost; *neotype* in the Ratzeburg Collection, Forstliche Hochschule, Eberswalde. *Type* of *M. circumscriptus* Nees, lost; *neotype* in the Reinhard Collection, Zoologisches Museum der Universität, Berlin; register serial number 26977. *Type* of *M. umbellatarum* Hal., in the Haliday Collection, National Museum of Ireland, Dublin. *Type* of *M. exiguus* Hal., lost. *Type* of *M. blancardellae* Bouché, in the Bouché Collection, Zoologisches Museum der Universität, Berlin; register serial number 13114. *Type-series* of *M. lividipes* Wesm., in the Wesmael Collection, Musée Royal d'Histoire Naturelle, Bruxelles; register serial number 2017. *Type* of *M. flavolimbatus* Ratz., in the Ratzeburg Collection. *Type* of *A. lautellus* Marsh., in the British Museum.

Host. The original descriptions of *M. circumscriptus*, *M. bicolor*, *M. umbellatarum*, *M. exiguus*, and *M. lividipes*, are without host record. *M. blancardellae* was originally described as a parasite of the Tineid *Tinea* (*Elachista*) *blancardella* F., which is now referred to the genus *Lithocolletis*; and *M. flavolimbatus* was originally described by Ratzeburg from *Tinea*, now *Lithocolletis*, *pomifoliella* Zell., now known as *L. blancardella* F., and from *Tinea*, now *Lithocolletis*, *populifoliella*, by which he could have intended either *populifoliella* of Treitschke or of Zeller; but Zeller's *populifoliella* is now known as *L. tremulae* Zell. *Apanteles lautellus* was originally described by Marshall from four Tineid hosts, *Gracilaria semifascia* Haw., *Lithocolletis lautella* Zell., *L. lantanella* Schr., and *L. cavella* Zell.

The Nees material of his *M. bicolor* is lost, and the first reviser, Ratzeburg (1848), whom I have accepted, redescribed the species from the Tineids *Tinea* (*Lithocolletis*) *pomifoliella* Zell., now *L. blancardella* F., *Tinea*, now *Lithocolletis*, *emberizaepennella* Bouché, *Tinea*, now *Lithocolletis*, *cavella* Zell., and *Tinea*, now *Tischeria*, *complanella* Hüb.; and Reinhard (1881), who also accepted Ratzeburg, gives these four names and also *L. populifoliella*, while Marshall (1885, 1888) follows Reinhard, but in addition gives a list of some twelve further hosts, which I shall discuss presently.

Of the material from which I have made my redescription, Lyle's five females numbered 2807-2810 and 2820 are recorded to have been bred from *Lithocolletis coryli* Nic., and his single female no. 4968 from *L. lantanella* Schr., from which latter host are recorded the two females from Hailey in the Oxford University Museum, on *Viburnum lantana*, and the five females from Box Hill in my own collection. The remaining Lyle female, no. 2819, is recorded from the Tineid *Gracilaria swederella* Thunb., a species now known as *G. alchimiella* Scop. The material from the Marshall collection labelled "J. H. W." is recorded from *Elachista gleichenella* F., and other material whose host is referable to this Tineid genus is the series from Bridgman's collection numbered 861, which is recorded from *E. taeniatella* Stn., the series of three females from Berlin dated Aug. 5th, 1929, which is recorded from *E. luticomella* Zell., on *Dactylis glomerata*, and Schutze's two series nos. 279 and 280, which are recorded from *E. apicipunctella* Stn. The only other material of this species of *Apanteles* from the British Museum with a host record is the series of four females from Whittinghame, which is recorded from *Phyllorhycter*, now *Lithocolletis*, *messaniella* Zell., from which is recorded also the single female dated March 1923 in the Oxford Museum, and Salt's six females in the Department of Zoology, Cambridge. Of the Bignell material, the two females from Bower are recorded from *Lithocolletis bremsiella* Frey, now known as *L. nigrescentella* Log., the single female determined as *nothus* simply "from furze," and the single female no. 3223 from *Lithocolletis spinicolella*, from which latter are recorded also the three females

from the Berlin Museum no. 3287, on *Prunus mahaleb*, and the seven females dated Nov. 16th, 1924, from Denmark; but the identity of this latter host is doubtful, the author's name being lacking—it might be either *spinicolella* Zell., or *spinicolella* H.-S., this latter name being now sunk under *L. dubitella* H.-S. The remaining material in the Bridgman collection with a host record, the three females no. 1154, is given as a parasite of *Lithocolletis vacciniella* Stn., now known as *L. junoniella* Zell., from which are recorded also Larsen's five females of 1925 and 1926, from the Copenhagen University Museum; and the remaining material in the Oxford University Museum, the two females from Shotover, as a parasite of *Lithocolletis cerasicolella* H.-S., on wild cherry, from which are recorded also A. C. W. Wagner's female no. 27, Schutze's three females no. 283, and the single female no. 3037 and the two females no. 3058, on *Prunus avium* and *Prunus mahaleb* respectively, from the Berlin University, the host in this latter record being given as *L. mahalebella* Muhlig, now synonymised under *cerasicolella*. Other material from the Berlin Museum with host a species of *Lithocolletis* is the single female dated Feb. 13th, 1927, which is recorded from *L. domesticella* Sorh., on *Prunus domesticus*, and the material from Potsdam no. 71791, which is recorded from *L. scabiosella* Dgl., from which latter are recorded also the series from my own collection from Dorking and Coulsdon. Of the remaining material in the Berlin Museum, the two females no. 2968 are recorded from *Gracilaria auroguttella* Steph., on *Hypericum perforatum*, and the single female no. 2973/88 from a dipterous host, *Napomyza xyjostei* Kirb., or *Agromyza* sp., on *Lenicera periclymenum*, or grass, a record I do not believe to be correct. The female from the Vienna Museum is recorded from *Lithocolletis alniella* Zell., a name now sunk under *L. alnifoliella* Dup.; and the male, from *L. roborella* L., by which perhaps is meant *L. roborifoliella* Dup., which is now sunk under *L. roboris* Zell. Herr Schutze's female no. 282 is recorded from *Lithocolletis tenella* Zell., and his female no. 260 from the Tineid *Ornix betulae* Stn. Finally, the material from Bologna is recorded from a species of *Lithocolletis* on *Viburnum*, and Wagner's five females no. 319 simply from *Lithocolletis* sp. The remaining material before me is without host record.

A few authors have mentioned one or other of the hosts I have given above. Because the host has already been given in this revision, I think it is only necessary here to refer to the papers, namely those by Billups (1886–1889), Bridgman (1884), Fitch (1881, 1884), Lépiney & Mimeur (1932), Rondani (1873), and Wolff & Krausse (1922).

In the literature, so far as I have as yet been able to examine it, there are various further records of hosts, some of which are obviously to be accepted, others of which are as obviously to be treated with very considerable reserve, or even rejected as unquestionably incorrect. Records of hosts I am prepared to accept, and which have as yet not been mentioned in this revision, are not very numerous. Diaz (1929) in a short biological paper has recorded *Lithocolletis quercifoliella* Zell., on oak, as a host of this species of *Apanteles*, which he calls *bicolor* Nees. From his illustrations it is quite obvious the parasite was correctly determined, but I should nevertheless very much have liked a reply to two letters I addressed him, asking for material. Fitch (1881), also under the name *bicolor*, records *L. scopariella* Zell., and the breeder as Mr. J. Sang. I have seen no such material, but in view of the host the record can well be accepted, especially as he states that nearly all his MICROGASTERINÆ were named by Reinhard. Rondani (1874, 1876), still under the name *bicolor*, records *L. millierella* Staud., on *Celtis australis*, and Fahringer (1922), under the name *circumscripthus*, gives as new records the species *L. stettinensis* Nicelli, *Chelaria hübnereella* Don.,

now known as *C. conscriptella* Hüb., and *Gracilaria elongella* L., and a record from literature that has in some way escaped me and whose reference I do not know, namely *Lithocolletis concommitella* Bankes, all of which records seem to me to be perfectly reasonable. I see no reason also why I should not accept Brischke's record (1882) of *Lithocolletis elutella*, although this specific name cannot be traced; his *L. pruni* is also a name I cannot trace. His record of the Tineid *Plutella porrectella* L., must also be accepted, I suppose, as also that of Morley (1906) of *Psyche*, now *Pachythelia*, *opacella* H.-S., bred by Chapman in 1899.

Records that I cannot accept, on account of the family of the host, are, under the name *bicolor*, Bignell's (1901) of the Geometrid *Gnophos obscuraria*, by which doubtless is meant *Nychiodes obscuraria* Vill.; under the name *umbellatarum*, Morley's (1936) of Marshall's manuscript note of the Arctiid *Arctia villica* L.; under the name *flavolimbatus*, Rudow's (1917) of the Agrotid *Panolis piniperda* Loshge, now known as *P. flammea* Schiff.; and under the name *lautellus*, Gaumont's (1922) of the Lymantriid *Euproctis chrysorrhoea* L., Morley's (1936) of the Agrotid *Diloba caeruleocephala* L., and Wagner's (1928) of the Agrotid *Gortyna ochracea* Hüb., now known as *Xanthoecia flavago* Schiff. Finally, records that I know for certain to be definitely incorrect are Watanabe's (1932) of the Lymantriids *Orgyia thyellina* Butl. and *Porthesia similis* Fuess., and Lyle's (1917) of the Tortricid *Paramesia*, now *Peronea*, *ferrugana* Treits.; I have seen the material on which these records were based. Marshall's (1885, 1888), Fahringer's (1930), Watanabe's (1932), and Rondani's (1876) persistent record of the Agrotid *Mamestra persicariae* L. as a host for this species of *Apanteles* is due entirely to Nees' erroneous action (1834) in sinking under his *circumscriptus* the *femoralis* of Bouché, which was originally described by Bouché from this host. Bouché's type, I would add, is known to me; the species is not referable even to the same section of the genus as *circumscriptus* Nees as here understood.

The twelve further hosts given by Marshall (1885, 1888), to which I made passing reference above, omitting any that I have already discussed, are the Tineids *Gracilaria tringipennella* Zell., *G. syringella* F., *Psychoides*, now *Teichobia*, *verhuelletella* Stn., *Nannodia*, now *Aristotelia*, *hermannella* F., and the Tortricid *Catoptria*, now *Eucoasma*, *aemulana* Schl.; but the source of his information with regard to these species remains as yet obscure. Fahringer (1935) has copied these names from Marshall, adding to his list names taken from Watanabe's work (1932), to which I have already referred.

Cocoons pure white, cylindrical, of a fine, semitransparent papyraceous texture, entirely devoid of any loose silken threads, save at the ends. Lyle (1917) remarks that the cocoon is slung, hammock-like, by threads of silk attached to either extremity, across the larval chamber of the host, this arrangement being particularly noticeable when found in the well-known chamber of *G. swederella*; but Ford, who has now had experience in the breeding of really considerable numbers of specimens of various species of *Apanteles* and *Microgaster*, while admitting to me that there is undoubtedly a thread attached to the ends of the cocoon, informs me that in his opinion by far the greater number of cocoons appear to be loose inside the mines of their host, and that they fall out when the mine is opened.

Commentary. Nees originally described his *M. bicolor* from an unstated number of females both in his own collection and in the Klug collection. He gave no host record, and in the second part of his work he did not refer to the name again or give any further indication as to the identity of his species. All

the Neesian material is lost, and there is nothing in the Klug collection labelled as *M. bicolor*.

The first reviser of *M. bicolor* Nees is Ratzeburg 1848. This author redescribed Nees' species, from an unstated number of both females and males, as a common parasite of *Lithocolletis*. In the Ratzeburg collection, standing under a scribbled label, as was to be expected, since the species was not described in the first volume of his work, were three females and one male. This material agrees perfectly with Ratzeburg's description, and also, which is as important, with Nees' original description, and is quite obviously to be accepted as the series from which a neotype must be selected; and, as may be seen above, I have selected a female as the neotype, and so labelled it. This series of Ratzeburg's agrees perfectly and in the minutest detail with all the other material before me of *A. circumscriptus* Nees as here understood, and also, which is a fortunate chance, with the *A. bicolor* Nees of Reinhard and of Marshall.

The name *bicolor* Nees cannot be used for the species I have redescribed, since it is a primary homonym of *Microgaster bicolor* Curtis, 1830. It may be argued that the Nees name is good because the Curtis name is a *nomen nudum*. But despite the fact that Curtis never described his species, his name cannot be considered as *nudum* in that he gave sufficient and ample indication by himself synonymising it under *alvearius*!

Nees originally described his *M. circumscriptus* from an unstated number of females only, from his own collection. He gave no host record nor any further indication as to the identity of his species, beyond in the second volume of his work synonymising with it the *M. femoralis* of Bouché, the original description of which latter does not agree with that of *circumscriptus*. All the Neesian material is, as is known, lost.

The first reviser of *M. circumscriptus* Nees is Reinhard 1881. This author synonymised and sunk this name under *A. bicolor* Nees, and redescribed the species, from an unstated number of females and males, as a common parasite of *Lithocolletis*. In the Reinhard collection, under the name *A. bicolor*, are nine females and three males. This material agrees perfectly with Reinhard's description, and also, which is as important, with Nees' original description of *M. circumscriptus*, and is quite obviously to be accepted as the series from which a neotype must be selected; and, as may be seen above, I am selecting a female as the neotype and so labelling it. As I have pointed out above, this material is obviously the same species as the *A. bicolor* Nees of Ratzeburg and of Marshall.

It may be remarked here that, in the original descriptions of *M. bicolor* and *M. circumscriptus*, Nees gave not one single character to differentiate the two species; and I am convinced the revisers were altogether correct to synonymise them.

Haliday originally described his *M. umbellatarum* from an unstated number of females only, from his own collection, since he mentioned no other, as was his habit when describing some material from some collection other than his own, and from material that apparently had not been bred, since he gave the habitat simply as flowers of *Angelica sylvestris*. In the remains of the Haliday collection in the Dublin Museum is a single female labelled "*umbellatarum*" and "74." This specimen agrees perfectly with Haliday's original description, and also with Bignell's, Bridgman's, and Marshall's conception of the species. I propose to accept it as the type, which almost undoubtedly it is; and I am so labelling it. It agrees perfectly and in the minutest detail with all the other material before me of *A. circumscriptus* Nees as here understood.

Haliday originally described his *M. exiguus* from an unstated number of females only, from his own collection, since he mentioned no other, as was his habit when describing some material from some collection other than his own, and from material that had not been bred, since he gave the habitat simply as Umbelliferae. In the remains of the Haliday collection in the Dublin Museum there is no material labelled with this name. The type is lost, therefore.

The first reviser of *M. exiguus* Hal. is Reinhard 1881. This author synonymised and sunk this name under *A. bicolor* Nees, and redescribed the species, from an unstated number of females and males, as a common parasite of *Lithocolletis*. As I have stated further back, in the Reinhard collection, under the name *A. bicolor*, are nine females and three males. This material agrees perfectly with Reinhard's description, and also, which is as important, with Haliday's original description of *M. exiguus* save only perhaps in the colour of the tegulae. I propose to ignore this colour character in this instance, and to accept Reinhard, not only because in *A. circumscriptus* the colour is so extremely variable, but also as this is the most convenient arrangement. Were I not to accept Reinhard, *M. exiguus* would remain a species unknown, since the only two other revisers of it, Marshall and Thompson, have followed Reinhard. Further, I do not propose to select any specimen and label it as the type; this is entirely unnecessary.

Bouché originally described his *M. blancardellae*, apparently from the female only, from an unstated number of specimens, and as a parasite of "*Tinea (Elachista) blancardella*." In the Bouché collection is a single female labelled in the usual manner for this collection with five labels—"Berlin"; a serial number, 13114; a red "type" label; the usual Stein label, "*Blancardellae* Bouché"; and with the usual Enderlein label, "*Apanteles blancardellae* (Bouché) Type." This specimen agrees perfectly with Bouché's original description, such as it is, and I am convinced that Stein and Enderlein were correct to accept it as the type of the species. It agrees perfectly and in the minutest detail with all the other material before me of *A. circumscriptus* Nees as here understood, as was to be expected in view of its host.

Wesmael originally described his *M. lividipes* from two females and four males taken by himself in the outskirts of Brussels. In the Wesmael collection in Brussels under this name are two females and three males. These specimens agree perfectly with Wesmael's original description, and are obviously to be accepted as the original material. They agree perfectly and in the minutest detail with all the other material before me of *A. circumscriptus* Nees as here understood; and it is of interest to note that Wesmael himself thought perhaps *M. lividipes* would thus subsequently be synonymised. Marshall, Reinhard, and Thompson all recognised this synonymy.

Ratzeburg originally described his *M. flavolimbatus*, in the second volume of his work, from a single female bred by Reissig from "*Tinea pomifoliella*," and from a single male from "*Tinea populifoliella*." In the Ratzeburg collection standing under this name were a female and a male. The female, which bears the serial number 342, was labelled "*flavolimbatus* Ratz" in Ratzeburg's own handwriting, but scribbled, as was to be expected, since the species was not described in the first volume of his work; and mounted with this specimen was a leaf with a quite typical leaf-blister of a *Lithocolletis*. This specimen, which agrees perfectly with Ratzeburg's original description, so far as that goes, is therefore obviously to be accepted as the type; and I have so labelled it. It agrees perfectly and in the minutest detail with all the other material before me of *A. circumscriptus* Nees as here understood, as was to be expected in view of

its host. The male that I mention above is unlabelled save for the serial number 296. There is no evidence that it is the male referred to by Ratzeburg, and in my own mind I am not altogether certain that it is the same species as his female : but luckily this is really of little importance.

Marshall originally described his *A. lautellus* from ten females, but further on in his description mentions fourteen specimens, all apparently bred by Elisha, and from species of *Lithocolletis* and *Gracilaria*. In the Marshall collection in the British Museum is a card of three females labelled simply as *lautellus* in the usual manner for the Marshall collection, and with a red type label, affixed by whom I do not know. These specimens agree perfectly with Marshall's original description, and are clearly to be accepted as part or remains of the original material; and I have now indicated with a cross the middle specimen of the three as the type. These three specimens agree perfectly and in the minutest detail with all the other material before me of *A. circumscriptus* Nees as here understood, as was to be expected in view of the hosts.

In my key (1932) the various references to this species, under whatever name, are substantially correct, but require considerable emendation in view of the now increased knowledge of the variability of the colour. But I do not propose to make these emendations at this time, if only because I am now far from certain *Apanteles circumscriptus* is rightly referred to my Group A (Marshall's Section IV). In view of the unusual nature of the suturing of the ventrites, in combination with other characters, I should prefer to erect for this species, together, perhaps, with *A. olivierellae* Wilkn. (1936), which I have not yet placed in the key, an altogether new Group; but I hesitate to do this at this time owing, especially, to my as yet imperfect knowledge of the palaearctic species.

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BEITRÄGE ZUR KENNTNIS DER *BEMBIDION*-ARTEN DES
FERNEN OSTENS (JAPAN, KOREA, OSTSIBIRIEN). II.
MITTEILUNG. (COLEOPTERA)

Von Dr. FRITZ NETOLITZKY.

Communicated by Mr. H. E. ANDREWES, F.R.E.S.

***Bembidion* (*Pseudolimnaeum*) *galloisi* sp. n.**

Kopf mit grossen, halbkugelförmig vorgequollenen und hinten scharf abgesetzten Augen. Die Stirnfalten hören mit dem zweiten Porenpunkte auf und überschreiten den Hinterrand der Augen nicht. Stirn und Klypeus mit schwachen Netzmaschen als Mikroskulptur; Scheitel ganz glatt, ohne Punktierung. Halsschild stark herzförmig, Hinterwinkel vollkommen rechtwinklig und etwas nach aussen vorgezogen, mit langem und scharfem Fältchen. Sehr charakteristisch ist die Ausbildung der Mittelfurche: sie beginnt hinter dem Vorderrande des Halsschildes und vertieft sich gegen den Hinterrand derart, dass die grobpunktierte Basis in zwei Hälften geteilt wird. Eine Mikroskulptur ist nur an den Rändern wenig deutlich sichtbar, die Scheibe selbst ist ganz glatt. Auf der Unterseite des Halsschildes sieht man zwischen Vorderhüfte und den Vorderecken eine Punktreihe.* Flügeldecken mit etwas abfallender Schulter, mit sieben mässig tiefen Punktreihen, die vor der Spitze verschwinden. Die beiden Borstenpunkte stehen in der dritten Reihe, wie dies für alle *Peryphus* die Regel ist. Charakteristisch ist die Mikroskulptur aus polygonalen Maschen, die beim Weibchen deutlich sind, beim Männchen aber undeutlicher werden ohne ganz zu verschwinden. Fühler, Palpen und Beine gelblichbraun. Ausgefärbte Stücke blau mit etwas grünlichem Schimmer. Länge 4.8–5.2 mm. Sternalfortsatz zwischen den Mittelhüften nicht eingedrückt und daher auch nicht gerandet, also wie beim Subgenus *Pseudolimnaeum*. Ventralsternite einfach beborstet.

Wegen des Halsschildes und des Metasternalfortsatzes stelle ich die neue Art in das Subgenus *Pseudolimnaeum*. Von *B. doderoi* (*viridimicans*) unterscheidet sich *B. galloisi* unter anderem durch die grossen Augen, die mangelnden Schafen und die Mikroskulptur der Flügeldecken aus Polygonen. Die Form und die Skulptur des Halsschildes ist bei beiden Arten zum Verwechseln ähnlich.

Fundorte: JAPAN: Chuzenji-See, 24.viii.1910, 27.viii.1909, 12.ix.1909, 20.vii.1910, 15.viii.1911 (*Gallois*) Umgebung von Tokyo, 1906. (*Edm. Gallois*.)

Die Belege befinden sich im Museum National d'Histoire naturelle, Paris.

***Bembidion* (*Pseudolimnaeum*) *aeneoviridimicans* sp. n.**

Der vorigen Art (*B. galloisi*) sehr ähnlich, doch etwas grösser (6 mm.), robuster, die Punkte der Halsschildbasis, seiner Unterseite und die der Flügeldecken gröber. Es fehlt dem Tiere, einem Weibchen, die Mikroskulptur auf den Flügeldecken, die für *B. galloisi* so charakteristisch ist.

Fundort: CHINA: Szechwan mer. Mts. Kinfushan. 2000 m. pr. flum. Sung-Kanho. Die Type in meiner Sammlung.

Bemerkung: Es ist sehr auffallend, dass Vertreter des bisher nur aus Europa bekannten Subg. *Pseudolimnaeum* auch im fernen Osten vorhanden sind; auch *B. bryanti* Andr. von Java möchte ich hierherstellen. Eine ähnliche disjunkte Verbreitung haben ebenfalls die Arten des Subg. *Limnaeum* (Europa, Japan, Kurilen, Kamtschatka). Bekanntlich wurden ähnliche Verbreitungstypen von Tier- und Pflanzenarten zur Stütze der "Pendulations-theorie" verwendet.

* Bei *B. doderoi* Ganglb. sind diese Punkte nur angedeutet.

BESCHREIBUNG NEUER ARTEN DER GATTUNG *AGRA* F. (COLEOPTERA-CARABIDAE)

Von MAX LIEBKE, Hamburg.

Communicated by G. J. ARROW, F.R.E.S.

Aus den Sammlungen des Britischen Museums liegen mir durch die liebenswürdige Zusendung des Mr. G. J. Arrow zahlreiche *Agra* Arten vor, darunter auch eine Reihe neuer Arten. Um dieselben richtig deuten zu können, ist es unbedingt notwendig, sie mit benachbarten Arten zu vergleichen, was ich untenstehend möglichst in Form von Tabellen gemacht habe. Leider sind diese Tabellen nicht so vollkommen ausgefallen wie es wohl wünschenswert wäre, ist doch die Kenntnis unserer Arten noch sehr ungenügend und sehr oft ist die Art nur in einem Geschlecht bekannt, oft auch in diesem nur mangelhaft beschrieben. Da mir nun zurzeit alle Klug'schen *Agra*-typen vorliegen, so habe ich dieselben nach Möglichkeit zum Vergleich herangezogen. Dies besonders auch deshalb, weil Chaudoir in seinen Schriften dieselben meist nur unvollkommen oder falsch deutet, oder sie garnicht in Betracht zieht. Eine vollständige Deutung aller Arten zu bringen verbietet mir zurzeit der Raummangel.

Agra cephalota sp. n.

Gelbbraun, Beine etwas heller, einfarbig. Grübchen der Flügeldecken mit grünlichem Glanz im Grunde.

Kopf langoval, mit sehr langem Hinterkopf, dieser ohne Scheitelgrübchen, nur in der Mitte der Basis liegen ein bis zwei Borstenpunkte. Fühler schlank, die Schultern überragend. Halsschild schmal, so lang wie der Kopf, kurz hinter der Spitze verengt, hinter der Mitte mässig erweitert, kurz vor der Basis scharf eingeschnürt. Oben mit vier Reihen sehr grober Punktgruben, die kaum einen freien glatten Platz lassen. Seiten der Vorderbrust ebenfalls grob und dicht punktiert. Flügeldecken kurz, hinter der Mitte stark erweitert, an der Spitze leicht schräg abgestutzt, Nahtwinkel nicht gezähnt, aber auch nicht abgerundet; Aussenwinkel kurz zugespitzt, Spitzenrand davor ausgeschweift. Punktstreifen von 2. an durch nicht allzu grosse Grübchen gebildet, die im Grunde schön metallisch leuchten. Zwischenräume schmal und flach.

Männchen: Hinterbrustmitte fein behaart, Trochanter der Hinterbeine kurz, abgerundet, kahl. Vorder- und Mittelschenkel leicht verdickt, Schienen einfach. Bauchringe 3-5 jederseits mit einem Haarfleck. Penis kräftig, gedrunken, Spitzenknopf dreieckig mit abgerundeten Winkeln, Schaft glatt, mit einem Mittellängskiel auf dem grössten Teil seiner Oberseite. Länge 14 mm.

Weibchen: Achtes Fühlerglied stark verkürzt. Länge 16 mm.

Ein Pärchen aus BRASILIEN: Serra de Communitaty, Pernambuco, (*Gounelle*, i.-iii. 1893), ein Weibchen aus BRASILIEN: Serra de Baturitã, Ceara (leg. Gounelle, i. 1895), im Brit. Mus. (type ♂) und in meiner Sammlung.

Sehr nahe mit *A. tarnieri* Chaud. verwandt, unterschieden durch die vorhandene Behaarung der Hinterbrust, auf deren Fehlen Chaudoir bei *tarnieri* aufmerksam macht, sowie durch die dunklere Farbe.

Agra germaini sp. n.

Vorderkörper schwarzbraun, Flügeldecken tief braungelb, nur die Epipleuren sind heller gelb. Unterseite dunkel braungelb, Fühler und Beine dunkelbraun. Flügeldecken mit leichtem grünlichem Erzglanz.

Kopf mässig lang, oval, oben glatt, Scheitel an der Basis mit sehr feiner Mittellinie, jederseits davon ein Punkt. Form des Hinterkopfes in beiden Geschlechtern gleich, kegelförmig, gegen die Basis plötzlich verengt. Halsschild schlank, länger als der Kopf, kurz hinter der Spitze ausgeschweift, von der Mitte an verbreitert, vor der Basis eingeschnürt. Oben mit vier Längsreihen grober Punkte, einzelne Punkte liegen auch dazwischen. Flügeldecken schlank, hinter der Schulter leicht verengt, hinter der Mitte verbreitert, Spitze schwach schräg abgestutzt, Nahtwinkel abgestumpft, Aussenwinkel kurz gezähnt. Punktstreifen durch Reihen grober Punkte abgelöst, die im Grunde grünlich leuchten. Zwischenräume flach.

Männchen: Hinterbrustmitte dicht kurz behaart. Trochanter der Hinterbeine gestreckt, schlank zugespitzt, an der Basis punktiert. Vorder- und Mittelschenkel stark verdickt; Schienen einfach, nur die Hinterschienen leicht gebogen. Bauchringe 1-5 jederseits der Mitte mit kleinem Haarfleck. Penis sehr kurz und breit, ähnlich dem von *viridisticta* Chaud. Spitzenknopf sehr kurz, breit abgerundet nach vorn, Seitenwinke spitz vorgezogen, an der Spitze kurz abgerundet. Schaftmitte mit kurzer Längsfurche. Länge 17 mm.

Weibchen: Achtes Fühlerglied verkürzt. Länge 17-18 mm.

Ein Männchen und drei Weibchen aus BRASILIEN: Caraca, Minas Geraes (*P. Germann*, 1884), im Brit. Mus. (type ♂) und in meiner Sammlung, sowie in der Sammlung H. E. Andrewes.

Gehört zwischen *cyanosticta* Klug und *brenthoides* Dej., von beiden getrennt durch die dunkle Farbe und die Form des Halsschildes.

***Agra smaragdula* sp. n.**

Kopf schwarz, Halsschild und Flügeldecken leuchtend blaugrün, Naht und Seitenrand der letzteren blauviolett; Unterseite mit Ausnahme des Kopfes ebenfalls blaugrün; Fühler und Beine einfarbig gelbrot.

Kopf oval, mit mässig langem, gerundet verengtem Hinterkopf, dieser mit kleinem, länglichem Scheitelgrübchen, von je einem Borstenpunkt flankiert. Fühler sehr lang und schlank. Halsschild lang, schlank, im Vorderdrittel sehr schmal, Seiten hier gleichlaufend, sodann etwas verbreitert, kaum gerundet, an der Basis am breitesten, kurz vor derselben scharf eingeschnürt. Oben mit vier Reihen grober Punkte, Mittellinie zum Teil kielartig erhaben, Seitenränder ebenfalls gekielt. Seiten der Vorderbrust glatt. Flügeldecken etwas länger als der Vorderkörper, mit stark schräg abfallenden schmalen Schultern, Seiten hinter der Mitte stark erweitert. Spitze gerade abgestutzt, Nahtwinkel rechtwinklig, kurz abgerundet, Aussenwinkel kurz gedorn, Spitzenrand daneben ausgeschweift. Punktstreifen deutlich, mit dicht gestellten, queren Punkten, Zwischenräume schwach gewölbt.

Männchen: Kopf mit schlankerem Hinterkopf. Hinterbrustmitte schmal kurz behaart; Trochanter kahl, Bauchringe 3-6 jederseits der Mitte mit länglichem Haarfleck, der fünfte Ring ist besonders lang behaart. Schenkel schwach verdickt; Schienen einfach. Penis sehr kurz und stämmig, der Übergang vom Spitzenknopf zum Schaft ist in keiner Weise durch Einkerbung oder Einbuchtung gekennzeichnet, die Mitte des Spitzenknopfes ist leicht ausgehöhlt und es erstreckt sich von hier eine kurze Längsfurche auf den Spitzenteil des Schaftes; Oberfläche im Grunde netzmaschig gerunzelt. Länge 10 mm.

Weibchen: Kopf mit etwas gedrungenerem Hinterkopf. Achtes Fühlerglied nicht verkürzt. Länge 11.5-12.5 mm.

Ein Männchen aus BRASILIEN: Mato de Coyab, Minas Geraes, im Berlin Museum (type ♂), zwei Weibchen im Brit. Mus. und in meiner Sammlung, eines aus Pará, eines aus Jatahy, Goyas.

Diese prächtige Art gehört hart neben *smaragdula* Chaud. und *graminea* Bates, von beiden getrennt durch die einfarbig gelbbraunen Fühler und Beine.

Agra prodigiosa sp. n.

Kopf und Halsschild dunkelbraun, letzterer mit grünem Erzschein, Flügeldecken kupfermessingfarbig, smaragdgrün widerscheinend; Fühler und Beine rotbraun, Unterseite dunkelbraun.

Kopf kurzoval, Seiten des Hinterkopfes kurz gerundet verengt, Scheitel mit schwach eingedrückter Längslinie, jederseits ein grober Borstenpunkt. Halsschild etwas länger als der Kopf, hinter der Mitte bedeutend breiter als der Kopf, nach der Spitze zu scharf verengt, ohne eingebuchtet zu sein, kurz vor der Basis eingeschnürt. Mittellinie vorn und Seitenwülste erkennbar; ganze Oberseite ausser diesen dicht und sehr grob punktiert, ebenso die Vorderbrust. Die groben Punkte der Oberseite neigen zu Verbindungen zueinander. Flügeldecken länger als der Vorderkörper, Schultern abgeschrägt, stark verrundet; Seiten hinter der Mitte stark erweitert, Spitze schwach schräg abgestutzt, Nahtwinkel kurz gedorn, an der Spitze abgerundet, Aussenwinkel scharf dornartig zugespitzt und ausgezogen, Spitzenrand daneben ausgeschweift. Punktstreifen eingedrückt, dicht und fein punktiert; Zwischenräume gewölbt, der 3. und 5. mit je einer Reihe von feinen Borstenpunkten.

Männchen unbekannt.

Weibchen: Achtes Fühlerglied nicht verkürzt. Länge 13–13,5 mm.

Zwei Weibchen, eines von BRASILIEN: Ega, Amazonas, eines vom BRIT. GUYANA: Essequibo R., Moraballi Creek (Oxford Univ. Exped. 1929, 23.x.29), beide im Brit. Mus. (type) und in meiner Sammlung.

Gehört hart neben *A. chaudoiri* Bates, von dieser Art getrennt durch die auf dem Hinterkopf eingedrückte feine Längslinie, anstelle eines Grübchens, durch die grobe, ineinanderfliessende Punktierung des Halsschildes, die gewölbten Flügeldeckenzwischenräume und andere Fühler- und Beinfarbe; von *A. brevicollis* Klug, mit welcher fast noch grössere Übereinstimmung vorhanden ist, getrennt durch kürzeren Hinterkopf, fehlendes Grübchen auf demselben sowie gröber punktierten Halsschild.

Agra andrewesi sp. n.

Schwarz, Fühler und Beine braun. Flügeldecken schwarzbraun, glänzend, mit schwachem Metallschein.

Kopf langoval, Hinterkopf mässig lang, Seiten desselben leicht gerundet trichterförmig verengt; Scheitel mit grosser Mittelgrube, hinter und seitwärts derselben eine Anzahl abstehender Borsten. Halsschild schlank, hinter der Mitte am breitesten, hier aber kaum so breit wie der Kopf, zur Spitze allmählich stark verengt, an der Spitze wieder etwas erweitert, an der Basis leicht verengt; Oberseite kaum uneben, Mittellinie nur sehr schmal kielig erhaben, Seitenwülste ebenfalls nur schwach erkennbar; ziemlich dicht und mässig grob, tief eingedrückt punktiert, ebenso die Seiten der Vorderbrust. Flügeldecken schlank, über die Schultern sehr schmal, hinter der Mitte erweitert, Spitze leicht schräg abgestutzt, Spitzenrand schwach ausgebuchtet, Nahtwinkel schwach verlängert, an der Spitze abgestumpft, Aussenwinkel ebenfalls rechtwinklig, doch scharf zugespitzt, ohne Dornverlängerung. Punktstreifen regelmässig, wenig stark eingedrückt, doch sehr deutlich punktiert, 2., 4. und 6. Streifen mit je einer (6, 6, 4) Reihe tief gebetteter Borstenpunkte. Fühler und Beine sind sehr lang und schlank. Trochanter der Hinterbeine mässig lang, an der Spitze abgerundet.

Männchen: Hinterbrustmitte dicht halblang abstehend behaart; Trochanter der Hinterbeine kahl, Bauchringe in der Mitte locker beborstet, doch ohne Borstenflecke zu bilden. Vorder- und Mittelschenkel schwach verdickt, Hinterschenkel einfach. Schienen einfach. Penis kräftig, Spitzenknopf vorn breit verrundet, Oberseite des Schaftes von der Spitze bis zur Mitte gefurcht. Länge 12,5 mm.

Weibchen: Kopf- und Halsschildform wie beim Männchen, Fühlerglied 8 nicht verdickt. Länge 13 mm.

Zwei Stücke in der Sammlung H. E. Andrewes (type ♂) und in meiner eigenen, BRASILIEN: S. Paulo de Olivenca, Amazonas (*de Mathan*).

Der Gruppe *A. variolosa* Klug zugehörig.

Kennzeichen der Gruppe:

Kleine Arten von 8–13 mm. Kopf meist kurzoval, breit, mit grosser Scheitelgrube, Weibchen haben das 8. Fühlerglied nicht verkürzt. Halsschild meist schlank, grob und weitläufig punktiert. Flügeldecken mit regelmässigen Punkstreifen, der 2., 4., und meist auch der 6. Streifen mit je einer Reihe mehr oder minder grober Punktgruben besetzt: Spitze zweizählig.

Hierher kann man mit Sicherheit rechnen *A. variolosa* Klug, *chalcoptera* Klug, *humilis* Putz., *foveigera* Chaud., *hilaris* Lbk., *longicornis* Lbk. und *andrewesi* Lbk., *excavata* Klug, *immersa* Klug und *multisetosa* Bates. Ferner gehören mit einiger Sicherheit in diese Gruppe *A. soror* Chaud., *phaenoptera* Chaud., *ignipennis* Lucas, *obscura* Chaud. und *cupreola* Chaud. Von *A. excavata* Klug, *immersa* Klug und *multisetosa* Bates kenne ich nur das Weibchen beziehungsweise war mir das genauere Untersuchen eines Männchens bisher nicht möglich, besonders lagen mir von den beiden Klug'schen Arten nur weibliche Typen vor, da andere nicht vorhanden sind.

Die mir im Männchen vorliegenden und untersuchten Arten sind wie folgend zu unterscheiden.

1 (6). Trochanter der Hinterbeine deutlich behaart.

2 (3). Penis mit sehr kräftigem Schaft, unterhalb des dreieckigen Spitzenknopfes nur schwach eingeschnürt, Oberseite der ganzen Länge nach mit flacher Längsfurche. Schwarz, Flügeldecken tiefbraun, ohne Metallschein, Fühler und Beine einfarbig braun. Kopf oval, Hinterkopf trichterförmig, schwach gerundet verengt, Scheitelgrube gross, Seiten des Hinterkopfes mit einigen abstehenden Borsten. Halsschild schlank, hinter der Mitte am breitesten, hier so breit wie der Kopf, zur Spitze allmählich verengt, an derselben nicht wieder erweitert. Mittellinie und Seitenwülste vorn deutlich erhaben, hinten verloschen. Oberseite grob und tief, ziemlich dicht punktiert, Seiten abstehend behaart. Flügeldecken mässig schlank, Schultern ziemlich breit, Seiten hinter der Mitte gerundet erweitert, Spitze fast gerade abgestutzt, Spitzenrand stark ausgerandet, Naht- und Aussenkante vorgezogen und zugespitzt. Punkstreifen kräftig punktiert, eingekerbt, Zwischenräume gewölbt, 2., 4. und 6. Streifen mit je 3–4 in Gruben stehenden Borstenpunkten, dieselben fallen jedoch weniger auf als bei *foveigera* und *andrewesi*, da die Punkstreifen an sich schon tief gebettet sind, und zudem auch öfter durch glatte Stege unterbrochen sind. Fühler und Beine sind sehr lang und schlank. Hinterbrustmitte dicht behaart, ebenso die kurzen und abgerundeten Trochanter der Hinterbeine. Bauchringe zerstreut behaart. Vorder- und Mittelschenkel schwach verdickt, einfach, Schienen einfach. Länge 10 mm. Brasilien. (Type ♂ im Museum Budapest).

A. longicornis Lbk.

- 3 (2). Penis mit schlankem Schaft, unterhalb des dreieckigen Spitzenknopfes stark eingeschnürt, Oberseite nicht längsgefurcht.
- 4 (5). Seiten des Hinterkopfes deutlich gewinkelt. Hinterbrustmitte kahl. Einfarbig schwarzbraun, mit leichtem Metallschein. Kopf kurzoval, Hinterkopf annähernd viereckig, mit grosser Scheitelgrube, diese von einigen Borstenpunkten umgeben. Halsschild mässig schlank, Seiten von der Spitze an schwach ausgeschweift verengt, zur Basis nur schwach verengt. Scheibe sehr grob punktiert, dazwischen mit drei fast vollständigen Längsrippen. Seiten der Vorderbrust grob und dicht punktiert. Flügeldecken mässig lang, hinter der Mitte kräftig erweitert, an der Spitze leicht schräg abgestutzt, aussen und innen lang bedornt. Punktstreifen kräftig punktiert und gut eingedrückt, der 2., 4. und 6. Streifen mit je einer Reihe grober Borstenpunkte. Hinterbrustmitte kahl und glatt. Trochanter der Hinterbeine kurz abgerundet, dicht behaart. Bauchringe 3–5 jederseits der Mitte mit einer Gruppe von 3–5 Borsten. Vorder- und Mittelschenkel leicht verdickt, absteigend beborstet. Hinterschenkel und Schienen einfach. Länge 11 mm. Bahia, S. Paulo, Amazonas. (Type ♂ im Museum Berlin) *A. variolosa* Klug.
- 5 (4). Seiten des Hinterkopfes gerundet verengt, ohne Neigung zur Winkelbildung. Mitte des Hinterkopfes fein und dicht behaart. Braun, Flügeldecken rötlich durchscheinend, Fühler und Beine gelbbraun. Ganze Oberseite metallglänzend, besonders stark auf den Flügeldecken. Kopf kurzoval, Seiten des Hinterkopfes gerundet verengt. Scheitelgrube sehr flach, von Borsten umgeben. Halsschild ziemlich plump geformt, Seiten von der Spitze an eine sehr kurze Strecke gleichlaufend, dann ziemlich plötzlich stark erweitert, zur Basis wieder leicht verengt. Oberseite grob punktiert, doch kaum gerippt. Flügeldecken mässig lang, hinter der Mitte erweitert, an der Spitze gerade abgestutzt; Spitzenrand schwach S-förmig geschweift, Innen- und Aussenwinkel gedornt, doch sind diese Dornen nicht lang ausgezogen wie bei voriger Art. Punktstreifen sehr regelmässig, von einzeln stehenden feinen Punkten gebildet, nicht furchig vertieft, der 2., 4. und 6. Streifen mit je einer Reihe grober Borstenpunkte. Hinterbrustmitte fein und dicht behaart, Trochanter von mittlerer Länge, stumpf zugespitzt, sehr fein und dicht behaart. Bauchringe ohne erkennbare Beborstung. Vorder- und Mittelschenkel verdickt, absteigend beborstet. Schienen einfach, Hinterschienen leicht S-förmig geschwungen. Länge 10 mm. Hamburg-Farm, Ebene von Limon, Kostarika (leg. F. Nevermann). (Type ♂ in Sammlg. Nevermann) *A. hilaris* Lbk.
- 6 (1). Trochanter der Hinterbeine kahl und glatt.
- 7 (10). Hinterschenkel innen mit langer tiefer Längsfurche, diese im Grunde punktiert, am Rande dicht mit langen Borsten besetzt. Hinterschienen S-förmig gebogen.
- 8 (9). Penis kurz, sehr kräftig, Spitzenknopf schwach vom Schaft abgesetzt, in der Mitte deutlich ausgehöhlt. Schaft oben glatt, nicht gefurcht. Schwarzerzfarbig, Fühler und Beine bräunlich. Länge 11 mm. Venezuela *A. humilis* Putzeys.
- 9 (8). Penis kurz, sehr schlank, Spitzenknopf deutlich abgesetzt; Schaft vom Hals bis zum Grund mit breiter Längsfurche, Spitzenknopf selbst ohne Aushöhlung in der Mitte der Oberseite, diese ist vielmehr leicht gewölbt. Schwarzbraun, erzfarbig, Fühler und Beine schwarzbraun. Länge 10,5 mm. Amazonas *A. foveigera* Chaud.
- 10 (7). Hinterschenkel einfach, ohne Längsfurche. Hinterschienen einfach, gerade. Kopf langoval, Halsschild schlank, besonders an der Spitze.

- 11 (12). Penis kräftig, mit kurzdreieckigem, an der Spitze breit abgerundetem Spitzenknopf; Schaft von der Mitte bis zur Spitze längsgefurcht. Schwarz, Flügeldecken schwarzbraun, glänzend, mit schwachem Metallschein. Fühler und Beine einfarbig braun. Länge 13 mm. Amazonas *A. andrevesi* Lbk.
- 12 (11). Penis mässig kräftig, mit länger dreieckigem, an der Spitze kurz abgerundetem, an den Seitenwinkeln zugespitzten Spitzenknopf. Längsfurche des Schaftes hat halbe Penislänge oder ist kürzer. Kopf, Halsschild und Unterseite schwarzbraun, Flügeldecken grünmessingfarbig und stark glänzend; Fühler einfarbig blassgelbbraun, Beine blassgelbbraun mit schwarzbraunen Schenkeln. Länge 13 mm. Stromgebiet des Amazonenstromes. (Type ♂ in Museum Berlin.) *A. chalcoptera* Klug.

Agra arrowi sp. n.

Dunkelrotgelb, nur die Scheibe der Flügeldecken ist leuchtend smaragdgrün, während Naht und Seiten breit rotgelb bleiben. Unterseite, Fühler und Beine ebenfalls einfarbig dunkelrotgelb.

Kopf oval, mit mässig langem Hinterkopf, dieser glatt, ohne Scheitelgrübchen, lediglich hart an der Basis ist ein winziger Eindruck in der Mitte. Jederseits 2 Borsten. Fühler schlank, die Schultern überragend. Halsschild kaum länger als der Kopf, kurz hinter der Mitte etwas verengt, hinter der Mitte kräftig erweitert, vor der Basis deutlich eingeschnürt. Oberseite wenig dicht grob punktiert; Seiten der Vorderbrust fast glatt, nur sehr wenige grobe Punkte nahe der Seitenkante. Flügeldecken mässig lang, fast kegelförmig, hinten nur wenig erweitert, Spitze schräg abgestutzt, innen und aussen mit kurzem, aber deutlichem Dorn. Punktstreifen unregelmässig zweireihig punktiert, einzelne Punkte tief eingedrückt; Zwischenräume hochgewölbt, schmal.

Männchen: Kopf hinten kegelförmig verengt. Vorderhüftfortsatz mit spitzem Höcker. Vorder- und Mittelschenkel verdickt, innen mit Borstensaum. Mittelschienen innen dicht bewimpert, Schienen sonst einfach. Hinterbrustmitte sehr dicht und sehr kurz behaart. Trochanter der Hinterbeine schlank, zugespitzt, kahl. Bauchringe ohne Haarflecke. Länge 17,5 mm. Penis sehr schlank, Endknopf dreieckig, mit breit abgerundeter Spitze und lang nach hinten ausgezogenen, dornartigen Hinterecken.

Weibchen: Hinterkopf geradlinig bis zur Basis, dann plötzlich kurz abgerundet verengt. Vorderhüften und Schenkel einfach. Unterseite kahl. Achtes Fühlerglied nicht verkürzt. Länge 20 mm.

Type ♂ in Sammlg. Liebke, ♀ ebenfalls, beide aus BRASILIEN: Hansa-Humboldt, Sta. Catharina, (*A. Maller*, i. 1933).

Agra gounellei sp. n.

Dunkelrotgelb, Flügeldecken dunkelviolettblau bis dunkelblaugrün.

Diese Art hat eine auffallende Ähnlichkeit mit *A. arrowi* m., sie unterscheidet sich in folgendem von ihr:

Die rotgelbe Farbe ist etwas dunkler, die Flügeldecken viel dunkler, die Seiten der letzteren sind sehr schmal gelbrot, ebenso die Naht.

Die Form und Skulptur ist die gleiche, doch sind die Seiten des Hinterkopfes beim Weibchen mehr gerundet verengt; beim Männchen ist der Hinterkopf nicht beborstet. Auch der Penis ist etwas anders geformt, doch ist der Unterschied schlecht zu beschreiben. Vor allem aber ist der Halsschild beim Männchen bedeutend schmaler hinter der Mitte.

Länge Männchen 16 mm., Weibchen 19 mm.

Zwei Männchen und ein Weibchen aus BRASILIEN : Jatahy, Goyas (*Gounelle*, xii.1897 und i.1898) im Brit. Mus. (type ♂) und in meiner Sammlung.

Die beiden vorstehenden Arten gehören in die Gruppe *A. feisthameli* Buq. Die Arten dieser Gruppe zeichnen sich aus durch die unregelmässig mehrreihig punktierten Punktstreifen. Zur näheren Unterscheidung der Arten gebe ich eine Tabelle dieser Arten.

1 (13). Kopf und Halsschild schwarz oder schwarzbraun gefärbt.

2 (10). Ganze Oberseite einfarbig schwarz.

3 (4). Ganzes Tier sammt Fühlern und Beinen schwarz. Glänzend. Kopf langoval, Seiten des Hinterkopfes gerundet verengt, letzterer mit kleinem länglichen Scheitelgrübchen, jederseits desselben ein Borstenpunkt. Halsschild wenig lang, an der Spitze schmal, weiten sich die Seiten nach kurzer Ausschweifung allmählich in schwacher Rundung, um kurz hinter der Mitte die grösste Breite zu erreichen, kurz vor der Basis eingeschnürt. Mittellinie kielartig erhoben, ebenso die Seitenränder, Scheibe ziemlich glatt, mässig dicht und mässig fein punktiert. Flügeldecken hinter der Mitte stark erweitert, Spitze schräg, geschweift abgestutzt, Naht- und Aussenwinkel kurz dornartig zugespitzt. Punktstreifen unregelmässig dicht mehrreihig punktiert, der 2., 4. und 6. mit je einer Reihe von 6–10 deutlichen Borstenpunkten. Männchen : Hinterbrustmitte dicht kurz behaart, Bauchringe ohne besondere Behaarung, Trochanter der Hinterbeine abgerundet, einzeln behaart. Schenkel kaum verdickt, Schienen einfach. Vorderbrustfortsatz ohne Höcker. Penis schlank, Spitzenknopf stark nach oben gebogen, quer, vorn breit abgerundet, Hinterwinkel kurz zugespitzt; Basalteil des Schaftes mit Mittelfurche, Oberseite fein netzmaschig gerunzelt. Länge 16 mm. Weibchen : Achtes Fühlerglied nicht verkürzt. Seiten des Hinterkopfes leicht gewinkelt. Länge 19 mm. KOSTARIKA. (Type ♂ im Museum Hamburg) *A. duplicata* Lbk.

4 (3). Gliedmassen wenigstens teilweise rotgelb.

5 (6). Fühler und Beine einfarbig rotgelb. Schwarz, glänzend. Kopf mässig lang, Hinterkopf konisch verengt, zur Basis plötzlich eingeschnürt, anstelle eines Scheitelgrübchens ist eine feine Längslinie eingedrückt, jederseits derselben einige grobe und feine Borstenpunkte. Halsschild mässig lang, zur Spitze stark, aber allmählich verengt, ohne Ausschweifung; Seiten vor der Basis eingeschnürt, Basalwinkel vorspringend. Mittellinie im Spitzendrittel kielartig erhoben, Scheibe zerstreut fein punktiert. Seiten der Vorderbrust sehr spärlich punktiert. Flügeldecken von der Mitte an kräftig erweitert, Spitze schräg geschweift abgestutzt. Naht- und Aussenwinkel dornartig ausgezogen. Punktstreifen tief eingedrückt, unregelmässig ein- und doppelreihig punktiert, 2., 4. und 6. Streifen mit je einer Reihe von 6–9 sehr feinen, unscheinbaren Borstenpunkten. Zwischenräume sehr breit, vollkommen flach. Männchen : Ganze Unterseite vollkommen glatt und kahl; Schenkel und Schienen einfach. Vorderbrustfortsatz ohne Höcker. Hinterrand des letzten Bauchringes tief eingekerbt. Hinterkopf etwas schlanker als beim Weibchen. Penis kräftig, oben mit flacher Längsfurche, Spitzenknopf, dreieckig, Spitze abgerundet. Länge, 16,5 mm. Weibchen : Achtes Fühlerglied nicht verkürzt. Länge 18 mm. Type ♂ in Sammlg. Nevermann, ♀ in meiner Sammlung, beide aus KOSTARIKA : Guapiles und Las Mercedes, Sta. Clara (*F. Nevermann*, 24.ix.34 und 24.xii.22).

A. nevermanni Lbk.

6 (5). Fühler oder Beine mehr oder weniger dunkel gefärbt.

7 (8. 9). Fühler schwarz, nur das erste Glied rotgelb. Beine schwarz, nur die Schenkel ohne die Kniee rotgelb. Schwarz, matt, Kopf mit leichtem, grünerzigem Schein; Flügeldecken mit sehr schwachem tiefblauem Schein. Punktgruben der Flügeldecken im Grunde grün leuchtend. Kopf kurzoval, Hinterkopf mit parallelen Seiten, diese zur Basis plötzlich verengt; ohne Scheitelgrübchen, doch am Seiten- und Hinterrand mit zahlreichen Punkten. Halsschild kurz und breit, zur Spitze allmählich verengt, vor der Basis leicht eingeschnürt. Oberseite ziemlich dicht sehr grob punktiert. Flügeldecken mässig lang, hinter der Mitte gut erweitert, Spitze innen gerade, aussen schräg abgestutzt; Spitzenrand in der Mitte gewinkelt, aber nicht gedorn, Aussenwinkel rechtwinklig, spitz, Nahtwinkel abgerundet. Punktstreifen sehr grob, doppelreihig punktiert, Zwischenräume äusserst schmal, im Grunde dicht netzmaschig gerunzelt. Männchen unbekannt. Weibchen: Länge 8 mm. BRASILIEN: Rio de Janeiro. (Type ♀ in Sammlg. Liebke)

A. perforata Lbk.

8 (7. 9). Fühler rotgelb mit dunklerer Basis. Beine rotgelb mit schwarzen Knien. Weibchen 15 mm. (Mir nur der Beschreibung nach bekannt). BRASILIEN: Amazonas *A. phaeogona* Bates

9 (7. 8). Fühler dunkel rotgelb, die Spitzen der einzelnen Glieder schwarz. Beine schwarz. Oberseite schwarz, glänzend, Unterseite dunkelpechbraun. Kopf oval, Seiten des Hinterkopfes stark gerundet verengt, Hinterkopf anstelle eines Scheitelgrübchens mit feiner Längslinie, jederseits derselben ein grober Borstenpunkt. Halsschild plump, Seiten von der Spitze an allmählich erweitert, kurz vor der Basis eingeschnürt, dann deutlich erweitert. Mittellinie vorn kielartig erhaben, auf der übrigen Strecke fein strichartig eingegraben. Scheibe unregelmässig zerstreut mittelgrob punktiert. Flügeldecken hinter der Mitte leicht erweitert, Spitze schräg geschwungen abgestutzt, Naht- und Aussenwinkel lang dornartig ausgezogen. Punktstreifen breit, grob doppelreihig punktiert. Borstenpunkte kaum erkennbar. Zwischenräume schmal, glatt, dachartig. Männchen: Vorderbrustfortsatz mit 2 dornartigen Höckern. Unterseite sammt Trochantern unbehaart. Schenkel leicht verdickt, Schienen einfach. Penis kräftig, Spitzenknopf queroval, ringsum abgerundet, Schaft in ganzer Länge gefurcht. Länge 16–18 mm. Weibchen unbekannt. KOLUMBIEN. (Type ♂ im Museum Stettin) *A. pehlkei* Lbk.

10 (2). Kopf und Halsschild tiefschwarz. Flügeldecken lebhaft blau, blaugrün oder schwarzgrün gefärbt. Fühler und Beine rotgelb. Vorderbrustfortsatz des ♂ ohne dornartige Höcker.

11 (12). Spitzenknopf des Penis längsrechteckig, schaufelförmig. Schwarz, glänzend, Flügeldecken dunkelblauviolett, um das Schildchen herum blaugrün, Fühler und Beine einfarbig braungelb. Kopf langoval, Hinterkopf leicht gerundet verengt, ohne Scheitelgrübchen, doch mit sehr feiner Längslinie. Halsschild zur Spitze mässig verengt, zur Basis etwas erweitert, Mittellinie fein eingedrückt, Scheibe zerstreut grob punktiert; Seiten der Vorderbrust zerstreut, etwas feiner punktiert. Flügeldecken hinter der Mitte leicht erweitert, Spitze abgeschrägt, doppelt ausgeschweift, Nahtwinkel kurz, Aussenwinkel länger gedorn. Punktstreifen tief eingedrückt, sehr unregelmässig doppelreihig punktiert. Zwischenräume schmal rippenartig. Männchen: Unterseite ohne Behaarung. Vorderbrustfortsatz einfach. Schenkel mässig verdickt, Schienen einfach. Länge 17 mm. Weibchen mir unbekannt. BRASILIEN *A. feisthameli* Buquet

- 12 (11). Spitzenknopf des Penis dreieckig, quer, Vorderwinkel abgerundet, Hinterwinkel scharf zugespitzt. Schwarz, glänzend, Flügeldecken schwarzgrün, mattglänzend; Unterseite schwarzbraun, Beine einfarbig gelbbraun, Fühlerbasalglied gelbbraun. Kopf kurzoval, Hinterkopf gerundet verengt. Scheitel mit feiner strichartiger Vertiefung in der Mitte, jederseits derselben einen groben Borstenpunkt und eine Anzahl feiner Punkte. Halsschildseiten zur Spitze verengt, vor derselben ausgeschweift, vor der Basis eingeschnürt. Mittellinie unvollkommen, Scheibe fast ganz glatt, nur wenige gröbere Punkte liegen neben Mittellinie und Seitenrand. Seiten der Vorderbrust zerstreut grob punktiert. Flügeldecken schlank, hinter der Mitte nur wenig erweitert, Spitze schräg geschweift abgestutzt, Nahtwinkel und Aussenwinkel in lange spitze Dorne ausgezogen. Punktstreifen unregelmässig doppelreihig punktiert, die beiden nebeneinander liegenden Punkte sind oft zusammengefloßen. Zwischenräume schmal, gewölbt. Männchen: Vorderbrustfortsatz ohne Höcker. Unterseite unbehaart. Schenkel und Schienen einfach. Länge 17,5 mm. Weibchen unbekannt. BRASILIEN: S. Paulo. Type ♂ im Museum Hamburg. (*Riedel*). *A. riedeli* Lbk.
- 13 (1). Kopf und Halsschild gelbbraun oder rotbraun.
- 14 (17). Ganze Oberseite einfarbig gelbbraun.
- 15 (16). Punktstreifen der Flügeldecken bestehen aus unregelmässigen Doppelpunktreihen, der 2., 4. und 6. Streifen tragen jeder eine Reihe von 5–7 wenig bemerkbaren Borstenpunkten. Einfarbig lehmig gelb. Kopf langoval, Seiten des Hinterkopfes zuerst gerade verlaufend, dann plötzlich gerundet zur Basis verengt; Scheitelgrübchen klein, mit jederseits ein paar Punkten. Halsschild etwas breiter als der Kopf, an der Spitze ziemlich schmal, von hier an allmählich erweitert. Mittellinie fein eingedrückt, Seiten gekielt, Scheibe ziemlich dicht punktiert. Seiten der Vorderbrust mit einigen groben Punkten. Flügeldecken hinter der Mitte mässig erweitert, Spitze schräg abgestutzt, Nahtwinkel rechtwinklig, Aussenwinkel dornartig zugespitzt. Punktstreifen unregelmässig doppelreihig punktiert, der 2., 4. und 6. Streifen mit je 5–7 unscheinbaren Borstenpunkten. Zwischenräume gewölbt, im Grunde netzartig gerunzelt. Männchen unbekannt. Weibchen: Achtes Fühlerglied nicht verkürzt. Länge 17 mm. MEXIKO. (Type ♀ in Sammlg. Liebke) *A. lutea* Lbk.
- 16 (15). Punktstreifen der Flügeldecken unregelmässig doppelreihig punktiert, der 2., 3., 4., 5. und 6. Streifen mit je einer Reihe sehr grober Borstengruben. Rötlich braungelb, Punktstreifen auf den Flügeldecken dunkelbraun. Fühler rotgelb mit den Spitzen der Glieder schwarz, Beine rotgelb, Kniee schwarz. Kopf kurz, mit kurzem Hinterkopf, Seiten desselben parallel, kurz vor der Basis scharf verengt. Anstelle des Scheitelgrübchens ist eine feine Längslinie eingegraben. Halsschild kurz und breit, Seiten zur Spitze stark verengt, vor derselben nicht ausgeschweift, Seiten vor der Basis eingeschnürt. Mittellinie in fast $\frac{2}{3}$ der Länge erhöht, Scheibe neben der Mittellinie und am Seitenrand dicht punktiert, dazwischen fast glatt. Flügeldecken kurz, gedrungen, hinter der Mitte erweitert, Spitze schräg S-förmig abgestutzt, Nahtwinkel rechtwinklig, Spitze hart daneben breit lappenförmig nach hinten vorgezogen, Aussenwinkel kurz gedorn. Punktstreifen nicht eingedrückt, auf der Vorderhälfte deutlich unregelmässig mehrreihig, auf der Hinterhälfte ungefähr einreihig punktiert; der 2., 3., 4., 5. und 6. Streifen mit je einer Reihe von 5–11 sehr groben Augenpunkten unterbrochen. Zwischenräume flach, und dort, wo sie nicht von den Augenpunkten

unterbrochen werden, auch breit. Männchen: Vorderbrustfortsatz mit zwei spitzen Höckern besetzt. Unterseite ohne Behaarung. Schenkel wenig verdickt; Schienen einfach. Penis mit dreieckigen Spitzenknopf, die Winkel desselben kurz abgerundet. Länge 16 mm. Weibchen unbekannt. BRASILIEN: Petropolis, Rio de Janeiro. Type ♂ in Sammlg. Liebke (*F. Ohaus*) *A. ohausi* Lbk.

- 17 (14). Kopf und Halsschild rotgelb oder rotbraun, Flügeldecken mehr oder weniger blau, violett oder blaugrün gefärbt.
- 18 (23). Flügeldecken blau, blaugrün oder violett, nur die Naht und die Seitenränder mehr oder weniger breit gelbrot gezeichnet, Scheibe ohne gelbe Flecke.
- 19 (20). Kleine Art von 11–13 mm. Länge. Flügeldecken hellolivgrün, Seitenkanten äusserst schmal gelb gefärbt. Kopf oval, sehr kurz, an der Basis plötzlich eingeschnürt, glatt, ohne Aushöhlung an der Basis. Halsschild vor der Basis nicht eingeschnürt, an derselben nicht verbreitert. Oberseite sehr kräftig punktiert, Unterseite glatt, bis auf einige grobe Punkte an den Seiten. Flügeldecken gekennzeichnet durch breite flache, von schmalen, glatten Zwischenräumen getrennte Furchen. Diese Furchen sind im Grunde erfüllt durch zahlreiche, in unregelmässigen Reihen stehende Punkte (nach Chaudoirs Beschreibung). MEXIKO *A. rugosostriata* Chaud.
- 20 (19). Grössere Arten von 16–20 mm. Länge.
- 21 (22). Männchen: Hinterkopf breiter, schwach konisch verengt; Penis-
spitzenknopf sichelförmig, hintere Winkel zugespitzt. Dunkelrot-
gelb, einzig die Scheibe der Flügeldecken leuchtend smaragdgrün,
während Naht und Seiten breit rotgelb bleiben. Halsschild vor der
Basis deutlich eingeschnürt, oben wenig dicht grob punktiert, Seiten
der Vorderbrust fast glatt. Flügeldecken mässig lang, fast walzen-
förmig, hinten kaum erweitert, Spitze schräg abgestutzt, innen und
aussern mit kurzem, aber deutlichem Zahn. Punktstreifen unregel-
mässig zweireihig punktiert, Zwischenräume hochgewölbt, schmal.
Männchen: Hinterkopf leicht kegelförmig verengt; Vorderbrust-
fortsatz mit breitem, flachem Dorn oder Höcker. Vorder- und
Mittelschenkel verdickt, innen mit Borstensaum. Mittelschienen
innen dicht bewimpert. Hinterbrustmitte sehr dicht und kurz
behaart, Trochanter der Hinterbeine zugespitzt, kahl. Bauchringe
ohne Haarflecke. Länge 17,5 mm. Weibchen: Hinterkopf gerad-
linig bis zur Basis, hier plötzlich scharf verengt. Unterseite einfach
und kahl. Achtes Fühlerglied nicht verkürzt. Länge 20 mm.
BRASILIEN: Sta. Catharina *A. arrowi* Lbk.
- 22 (21). Männchen: Hinterkopf schmaler, mehr trichterförmig verengt.
Penisknopf mit abgerundeten Hinterwinkeln. Übrige Auszeich-
nungen wie bei voriger Art. Weibchen: Hinterkopf bauchig erwei-
tert, an der Basis gerundet verengt. Länge 19 mm. Dunkelrotgelb,
Flügeldecken dunkelviolet bis dunkelblaugrün mit sehr schmal
gelbroten Seiten und Naht. BRASILIEN: Goyas . . . *A. gounellei* Lbk.
- 23 (18) Flügeldecken ausser den Seiten und der Naht ringsum auch noch auf
der Scheibe gelbrot gezeichnet.
- 24 (25). Flügeldecken blaugrün, Seiten ringsum, 1., 2. und 5. Zwischenraum
von der Schulter bis zu $\frac{3}{4}$ der Länge, 3. Zwischenraum im letzten
Viertel der Länge gelbrot. Länge 14 mm. (Ich kenne die Art nur
aus der Beschreibung und Bates' Abbildung). MEXIKO.
A. virgata Chevr.
- 25 (24). Flügeldecken blaugrün, Seiten und Spitzenrand sehr schmal, Naht, 1.
Zwischenraum von der Schulter bis zu $\frac{3}{4}$ der Länge gelbrot, ferner
ein kürzerer Längsfleck im Vorderdrittel auf dem 4. Zwischenraum,

2 gestaffelte Flecke hinter der Mitte auf dem 4. und 6. Zwischenraum und 2 ungefähr rundliche Flecke kurz vor der Spitze auf den Zwischenräumen 2, 3, 4, und 6, 7, 8. Beine gelbbrot mit schwarzen Knien. Kopf kurzoval, Seiten des Hinterkopfes vor der Basis gewinkelt, Scheitelgrübchen fehlt und ist durch eine feine Längslinie ersetzt, jederseits derselben 3–4 Borstenpunkte. Fühler kurz; kräftig. Halsschild verhältnismässig kurz und breit, Seiten zur Spitze geradlinig verengt, vor der Basis leicht eingeschnürt. Mittellinie in ganzer Länge als feine Furche erkennbar, Seiten vollständig gekielt. Scheibe zerstreut fein punktiert, Seiten und Basis gröber und dichter. Flügeldecken von der Mitte an deutlich erweitert, Spitze auf der inneren Hälfte gerade, auf der äusseren schräge abgestutzt. Naht- und Aussenwinkel sind beide kurz gedorn. Punktstreifen breit, ausserordentlich grob doppelreihig punktiert, die Punkte fliessen oft der Quere nach ineinander. Zwischenräume sehr schmal und kielartig. Weibchen: Achtes Fühlerglied nicht verkürzt. Länge 12 mm. Männchen unbekannt. BOLIVIEN. Type ♀ in Sammlg. Liebke *A. ocellata* Lbk.

***Agra foraminosa* sp. n.**

Schwarz, Mundteile, Fühler und Beine einfarbig rötlichbraun.

Kopf auf der Stirn mit kleinem, halbmondförmigem Eindruck, Hinterkopf mässig lang. Seiten desselben gerundet verengt; grosse, runde, verhältnismässig tiefe Scheitelgrube, ringsum dieselbe eine Anzahl abstehender Borsten. Fühler sehr lang, die Schultern weit überragend. Halsschild länger als der Kopf, hinter der Mitte gut erweitert, vor der Basis eingeschnürt. Oberfläche ziemlich verwirrt grob runzlich punktiert, Zwischenräume sehr schmal. Seiten der Vorderbrust ziemlich dicht grob punktiert. Flügeldecken ziemlich kurz, hinter der Mitte leicht erweitert. Spitze leicht schräg abgestutzt, Naht- und Aussenwinkel mit deutlichem Dorn, der Nahtdorn am längsten ausgezogen. Acht Reihen grober langlicher, tiefer Gruben, die im Grunde deutlich punktiert sind; Zwischenräume sehr schmal und hochgewölbt.

Männchen: Ein schmaler Mittelstreifen der Hinterbrust ist lang abstehend behaart, ebenso die am Ende abgerundeten Trochanter der Hinterbeine; Bauchringe ohne dichtere Beborstung. Vorder- und Mittelschenkel schwach verdickt, innen lang bewimpert, Hinterschenkel einfach; Mittelschienen einfach geformt, innen im letzten Drittel vor der Spitze dicht bewimpert, Hinterschienen leicht gebogen. Penis schlank, Schaft auf der Oberseite glatt, ohne Längsrille, Spitzenknopf dreieckig, in der Mitte leicht muldenförmig vertieft, an den Seitenwinkeln abgestumpft.

Weibchen unbekannt.

Zwei Männchen aus ECUADOR im Brit. Mus. (Type ♂) und in meiner Sammlung eines aus BOLIVIEN, Santa Cruz de la Sierra (*Steinbach*, i.iv.1904) im Mus. Berlin, eines aus PERU, oberer Madre de Dios (500 m.) im Mus. Dresden.

***Agra mira* sp. n.**

Schwarzbraun, Flügeldecken mit leichtem Erzglanz.

Kopf oval, mit ungewöhnlich grossem Hinterkopf, so in der Länge wie in der Breite. Oben glatt, ohne Grübchen. Fühler lang und schlank, die Schultern weit überragend. Halsschild nicht länger als der Kopf, von der Spitze an allmählich gerundet erweitert, kurz vor der Basis deutlich eingeschnürt. Oberfläche rau, dicht grob punktiert, nur

wenig Platz freilassend, Mittellinie auf der Vorderhälfte und je eine Längelinie zwischen dieser und dem Seitenrand rippenartig erhoben, auch der Seitenrand ist rippenartig erhoben. Seiten der Vorderbrust vorn sehr grob und dicht punktiert. Flügeldecken schmal, besonders über die Schultern, hinter der Mitte kräftig erweitert, Spitze schräg abgestutzt; Naht- und Aussenwinkel kurz zugespitzt. Punkstreifen tief eingedrückt, aus sehr dicht stehenden queren Punkten gebildet, stellenweise durch schmale Stege unterbrochen; Zwischenräume schmal, gewölbt.

Männchen: Hinterkopf konisch verengt. Hinterbrustmitte sehr fein punktiert und behaart, ebenso die an der Spitze abgerundeten Trochanter der Hinterbeine. Vorder- und Mittelschenkel kräftig verdickt, an der Vorderkante innen kammartig lang bewimpert. Schienen einfach. Bauchringe 2-6 in der Mitte dicht breit behaart. Penis im Gegensatz zu allen anderen, bisher von mir untersuchten Arten, unregelmässig geformt, der Schaft ungleichmässig breit, kurz vor der Spitze scharf nach rechts gebogen, linke Seite mit mehreren Einbuchtungen, Spitzenknopf verhältnismässig recht klein und nicht in der Richtung der Schaftlängsachse liegend, sondern stark nach rechts abgerückt, unregelmässig geformt. Der unterseits gelegene Samenleitkanal ist ebenfalls gebogen (ich würde die Penisgestalt für eine Abnormität gehalten haben, wenn mir nicht zwei Männchen mit genau gleicher Form des Penis vorgelegen hätten).

Länge 14 mm.

Weibchen: Achtes Fühlerglied deutlich verkürzt. Seiten des Hinterkopfes erweitert, dann allmählich gerundet verengt. Unterseite kahl. Länge 15-17 mm.

Neun Stücke aus BRASILIEN: Jatahy, Goyaz, vorliegend, davon zwei Männchen und vier Weibchen im Brit. Mus. (type ♂) und in meiner Sammlung, drei Weibchen im Berl. Mus.

Abgesehen von der überaus merkwürdigen Penisform, ist das Tier am besten in der Gruppe *exarata* Klug untergebracht, von allen Arten unterschieden durch das fehlende Scheitelgrübchen und durch nur 2-zählige Flügeldeckenspitze, sowie durch den ungewöhnlich grossen Hinterkopf. Von den zu dieser Gruppe gehörenden Arten *exarata* und *multiplicata* Klug ist mir leider die Penisform unbekannt, da die typischen Tiere des Berliner Museums Weibchen sind, wie ich mich überzeugen konnte.

Die Arten der Gruppe *A. exarata* Klug sind wie folgt zu unterscheiden:

- 1 (26). Spitze der Flügeldecken mehr oder weniger deutlich doppelbuchtig abgestutzt, sodass 3 Winkel vorhanden sind.
- 2 (5). Nahtwinkel in eine lange Spitze ausgezogen, viel länger als der Mittel- und Aussenwinkel.
- 3 (4). Beine einfarbig gelbbraun.

Kopf langoval, Hinterkopf länglich, allmählich gerundet verengt. Scheitelgrübchen lang, furchenartig, tief eingedrückt. Halsschild sehr breit, breiter als der Kopf, in der Mitte am breitesten, gegen die Basis mässig verengt, vor derselben eingeschnürt, gegen die Spitze stark verengt, vor derselben ausgeschweift. Scheibe gewölbt; Mittellinie fein strichartig eingedrückt und gleichzeitig fein kielartig erhoben, jederseits von einfacher Punktreihe begleitet. Seitenkiel innen von Doppelreihe grober Punkte flankiert, zwischen beiden Punktreihen ein glatter, gewölbter Streifen. Seiten der Vorderbrust ziemlich dicht grob punktiert. Flügeldecken kurz, mit stark abfallenden Schultern, Seiten hinter der Mitte stark erweitert, Spitze schräg doppelbuchtig abgestutzt, alle drei Winkel zugespitzt, Nahtwinkel sehr lang gedorn, auch der Aussenwinkel, doch nicht ganz so lang. Punkstreifen kaum eingedrückt, von mittelfeinen, einzeln stehenden Punkten gebildet, Streifen vom 3. an unregelmässig durch

Stege unterbrochen, so flache Längsgruben bildend, in denen die Streifen laufen. Borstenpunkte nicht erkennbar; Zwischenräume flach, glatt. Schwarz glänzend, Halsschild und Flügeldecken mit schwachem Metallschein. Mundteile, Fühler und Beine einfarbig gelbbraun.

Männchen: Hinterbrustmitte, Hinterhüften, Trochanter der Hinterbeine, Bauchringe 1–6 in der Mitte dicht und lang gelb behaart. Schenkel mässig verdickt, einfach, Schienen einfach. Penis schlank, mit querovalen, ringsum abgerundeten Spitzenkopf. Länge 16 mm. Weibchen: unbekannt.

Das einzige mir vorliegende Stück ist ein mit "Cayenne" bezettelttes Männchen der Sammlung Klug, welcher dieses in seinen "Monographien" p. 34 erwähnt.

CAYENNE? *A. attelaboides* F.

4 (3). Beine einfarbig schwarz.

Kopf kurzoval, Hinterkopf verhältnismässig gross, Seiten desselben fast gewinkelt verengt; Scheitelgrübchen länglich, tief, jederseits ein Borstenpunkt. Halsschild ungefähr in der Mitte am breitesten, zur Spitze allmählich gerundet verengt, kurz vor derselben ausgeschweift, Seiten vor der Basis eingeschnürt. Mittellinie gekielt, jederseits eine tiefe Längsfurche mit einer groben Punktreihe im Grunde; Seitliche Punktreihe grob und unregelmässig. Vorderbrust dicht grob punktiert. Flügeldecken mässig lang, hinter der Mitte erweitert, Spitze schräg doppelbuchtig ausgeschweift; Nahtwinkel lang dornartig zugespitzt, die beiden anderen Winkel kurz zugespitzt. Punktstreifen gut eingedrückt, fein und dicht punktiert, ziemlich regelmässig durch Stege unterbrochen. Zwischenräume flach und glatt. Schwarz, Flügeldecken mit sehr schwachem Metallschein, Punkte der Punkt-reihen im Grunde blaugrün leuchtend. Fühler schwarzbraun, vom 4. Glied an gelbbraun, mit schwarzer Spitze. Beine einfarbig schwarz. Männchen unbekannt. Weibchen: Aechtes Fühlerglied verkürzt. Hinterrand des Afterringes in der Mitte tief ringförmig ausgeschnitten. Länge 18 mm.

KOLUMBIEN, Oberer Magdalenaenstrom. Type ♀ in Sammlg. Liebke.

A. incisa Liebke

5 (2). Nahtwinkel der Flügeldecken nicht länger zugespitzt als Mittel- und Aussenwinkel.

6 (11). Beine einfarbig schwarz. Männchen: Ganze Mitte der Unterseite von der Hinterbrust an dicht und lang zottig behaart.

7 (8). Hinterschenkel des Männchens mit tiefer, an den Rändern lang bewimpelter Längsfurche.

Kopf oval, mit mässig langem, allmählich gerundet verengtem Hinterkopf. Scheitelgrübchen länglich, tief eingedrückt. Halsschild breit, bis über die Mitte hinaus gleichmässig breit, zur Spitze dann ziemlich kräftig verengt und leicht ausgeschweift. Scheibe mit vier unregelmässig doppelreihigen groben Punkt-reihen, dazwischen schmale glatte Streifen. Seiten der Vorderbrust dicht und grob punktiert. Flügeldecken mässig lang, hinter der Mitte leicht erweitert, Spitze schräg doppelbuchtig abgestutzt, die beiden äusseren Winkel stumpf zugespitzt, der Nahtwinkel abgerundet. Punktstreifen fein punktiert und ziemlich gut eingedrückt, unregelmässig unterbrochen durch Querstege; Zwischenräume leicht gewölbt, glatt. Borstenpunkte nicht erkennbar. Kopf und Halsschild schwarzbraun, letzterer mit Metallglanz; Flügeldecken grün, metallisch glänzend. Unterseite schwarz; Fühler braun, gegen die Spitze rötlich; Beine schwarzbraun.

Männchen: Hinterbrustmitte dicht und lang behaart. Trochanter der Hinterbeine abgerundet, lang behaart. Bauchringe 1-6 Mitte dicht lang behaart. Alle Schenkel stark verdickt und innen lang bewimpert, Hinterschenkel innen mit langer, flacher, am Rande lang bewimperter Nute; Mittelschienen innen kurz vor der Spitze mit Höcker, Hinterschienen einfach. Penis sehr kräftig, mit ungefähr längsrechteckigem Spitzenknopf, dieser mit allen Winkeln abgerundet, oben mit kurzer Längsfurche. Schaft ebenfalls mit kurzer Längsfurche auf der Oberseite. Länge 18 mm.

Weibchen unbekannt.

BRASILLEN: Bahia. Type ♂ in Sammlg. Liebke . . . *A. absurdus* Liebke

8 (7). Hinterschenkel des Männchens einfach, ohne Längsfurche.

9 (10). Vorder- und Mittelschenkel des Männchens stark verdickt.

Kopf langoval, Hinterkopf mit allmählich gerundet verengten Seiten, jederseits einige Borsten. Scheitelgrübchen flach, nach hinten in eine vertiefte Längsrinne auslaufend. Halsschild schlank, vor der Mitte am breitesten, von hier an zur Spitze allmählich verengt, kurz vor der Spitze ausgeschweift. Scheibe mit drei dachartig erhobenen glatten Längsstreifen, die übrige Fläche grob punktiert, ebenso sind die Seiten der Vorderbrust fast noch dichter und gröber punktiert. Flügeldecken ziemlich kurz, hinter der Mitte erweitert, Spitze schräg doppelbuchtig abgestutzt, Nahtwinkel vorgezogen, an der Spitze abgerundet, die beiden anderen Winkel zugespitzt. Punktstreifen tief eingedrückt und sehr dicht mittelfein punktiert, unregelmässig durch Stege unterbrochen. Borstenpunkte nicht erkennbar. Zwischenräume gewölbt, glatt. Schwarzbraun, glänzend, Flügeldecken mit feinem tiefgrünem und dunkelviolettem Metallschein; Unterseite pechbraun; Fühler schwarzbraun, vom 5. Glied an gelbbraun mit dunklen Spitzen. Beine einfarbig schwarzbraun.

Männchen: Hinterbrustmitte, Hinterhöften, Trochanter der Hinterbeine und Bauchmitte (1.-6. Ring) dicht lang behaart. Vorder- und Mittelschenkel stark verdickt, innen lang bewimpert, Hinterschenkel nicht verdickt. Schienen innen lang bewimpert. Penis sehr kräftig, mit schaufelförmigen Spitzenknopf; Schaft glatt, nur auf der Basalhälfte mit Längsfurche. Länge 18 mm.

Weibchen unbekannt.

ECUADOR. Type ♂ in Sammlg. Liebke. *A. cochlearis* Liebke

10 (9). Vorder- und Mittelschenkel des Männchens kaum verdickt.

Kopf oval, Hinterkopf mässig lang, trichterförmig, leicht gerundet verengt. Scheitelgrübchen sehr flach. Halsschild so breit wie der Kopf, zur Spitze allmählich stark verengt, vor derselben leicht ausgeschweift. Jederseits der Mittellinie eine Reihe grober Punkte, neben dem Seitenrand innen eine Doppelreihe ebensolcher Punkte; der Zwischenraum zwischen innerer und äusserer Punktreihe ist gewölbt und unpunktiert. Flügeldecken mässig lang, hinter der Mitte erweitert, Spitze schräg doppelbuchtig abgestutzt, Nahtwinkel kurz vorgezogen, an der Spitze abgerundet; Mittel- und Aussenwinkel zugespitzt. Punktstreifen tief eingedrückt, dicht fein punktiert, in regelmässigen Abständen durch schmale Stege unterbrochen, die die Streifenabschnitte in schmale Kästen aufteilen. Zwischenräume schmal, gewölbt, glatt. Einfarbig schwarz, glänzend, nur die Fühlerspitzen rötlich.

Männchen: Hinterbrustmitte lang und dicht behaart. Trochanter der Hinterbeine lang behaart. Bauchringe 1-6 in der Mitte ebenfalls lang und dicht behaart. Vorder- und Mittelschenkel verdickt und dicht lang bewimpert, Hinterschenkel einfach. Mittelschienen

kurz vor der Spitze innen verbreitert und stumpf gedorn. Hinter-
schienen einfach. Penis kräftig, Spitze schaufelförmig. Länge 18 mm.
Weibchen unbekannt.

BOLIVIEN : Sta. Cruz della Sierra. Type ♂ in Sammlg. Liebke.

A. andina Liebke

- 11 (6). Beine nicht einfarbig schwarz, stets mehr oder weniger rotbraun oder
gelbbraun gefärbt.
12 (19). Beine einfarbig rotbraun oder gelbbraun.
13 (14). Vorderkörper gelbbraun.

Kopf oval, mit mittellangem, gerundet verengtem Hinterkopf; Scheitel-
grübchen länglich, flach. Halsschild auf der Basalhälfte von erheb-
licher Breite, zur Spitze allmählich in flachem Bogen verengt, kurz
vor der Spitze ausgeschweift. Mittellinie kielartig erhoben, jederseits
von einer groben Punktreihe begleitet, daneben wieder ein bis zur
Mitte reichender Längskiel, am gleichfalls scharf gekennzeichneten
Seitenrand verläuft eine Doppelreihe grober Punkte. Seiten der
Vorderbrust ziemlich dicht grob punktiert. Flügeldecken ziemlich
kurz, hinter der Mitte erweitert, Spitze schräg doppelbuchtig abge-
stutzt, dreidornig, doch ist nur der Aussenwinkel spitz, die anderen
beiden mehr oder weniger an der Spitze abgerundet. Punktstreifen
flach eingedrückt, sehr fein und dicht punktiert, in unregelmässigen
Abständen unterbrochen durch glatte Stege, die so entstandenen
Längsgruben sind ziemlich flach. Borstenpunkte sind nur schwach
erkennbar. Zwischenräume flach und glatt. Gelbbraun, Flügel-
decken etwas dunkler, grünerzglänzend.

Männchen : Hinterbrustmitte, Innenseiten der Schenkel, Trochanter
der Hinterbeine und Bauchringe 1-6 in der Mitte dicht und lang
zottig behaart. Alle Schenkel, besonders aber die Mittelschenkel,
stark verdickt. Mittelschienen gegen die Spitze verdickt und innen
dicht bewimpert. Penis mit schaufelförmiger Spitze. Länge 19 mm.

Weibchen unbekannt.

Die obige Beschreibung ist vom einzigen typischen Männchen
genommen.

BRASILLEN : Para. Type ♂ im Museum Berlin . . . *A. clavipes* Klug.

- 14 (13). Vorderkörper schwarzbraun bis schwarz.
15 (16). Furchen der Flügeldecken gleichmässig rillenartig eingedrückt,
Zwischenräume gleichmässig flach gewölbt.

Kopf oval, Scheitelgrübchen fein flach, hinten strichartig vertieft,
jederseits ein Borstenpunkt. Halsschild länger als der Kopf, hinter
der Mitte am breitesten, nach vorn allmählich verengt, an der Spitze
kurz erweitert, vor der Basis eingeschnürt. Mittellinie fein strichartig
eingedrückt, jederseits mit unregelmässiger grober Punktreihe
begleitet, der kielig erhobene Seitenrand auf der Innenseite ebenfalls
durch unregelmässige mehrreihige Punktreihe begleitet; Zwischen-
räume zwischen innerer und äusserer Punktreihe glatt. Vorderbrust
mit Ausnahme der glatten Mitte dicht grob punktiert. Flügel-
decken hinten deutlich erweitert, an der Spitze schräg doppelbuchtig
abgestutzt, Aussen- und Mittelwinkel kurz zugespitzt, Nahtwinkel
vorgezogen, aber abgerundet. Punktstreifen dicht punktiert, die
inneren mit einfachen runden, die äusseren, vom 3. etwa an, mit
queren Punkten, häufig unterbrochen durch glatte Stege, sodass die
Punktstreifen wie scharf abgeteilte Längsrillen erscheinen. Die
Zwischenräume sind leicht gewölbt; auf dem 2. und 4. stehen je
3-4 Borstenpunkte. Schwarz, Flügeldecken schwarzblau mit feinem
grünlichem Metallschein; Fühler rötlichbraun mit dunklerem Basal-
glied, Beine pechbraun.

Männchen unbekannt.

Weibchen: (Nach einzigem Typus beschrieben) achtes Fühlerglied nicht verkürzt. Bauchringe jederseits der Mitte mit dünnem, aber langbehaartem Fleck, letzter Bauchring vor dem Hinterrand mit je einem grossen Borstenpunkt besetzt. Spitzenrand dreimal leicht ausgebuchtet, die mittlere Bucht ist die tiefste, Buchten wie Vorsprünge sind abgerundet. Länge 17,5 mm.

BRASILIEN: Para. Type ♀ im Museum Berlin . . . *A. exarata* Klug.

16 (15). Furchen der Flügeldecken ungleichmässig ausgebildet, die Zwischenräume ungleichmässig gewölbt, wie verbeult.

17 (18). Punkte der Flügeldecken rund.

Kopf oval, Hinterkopf allmählich gerundet verengt. Scheitelgrübchen unscheinbar, flach, jederseits ein Borstenpunkt, Seiten nahe der Basis zerstreut behaart. Halsschild so breit wie der Kopf, zur Spitze allmählich verengt, kurz vor der Spitze ausgeschweift. Scheibe in 4 Längsreihen grob punktiert, dazwischen mit glatten Längskielen. Seiten der Vorderbrust ziemlich dicht grob punktiert. Flügeldecken kurz, hinter der Mitte stark erweitert, Spitze schräg doppelbuchtig abgestutzt. Aussenwinkel zugespitzt, Mittelwinkel nur angedeutet, Nahtwinkel stumpf abgerundet, nur schwach vorgezogen. Punktstreifen mässig tief eingedrückt, fein punktiert, Punkte rund, sehr unregelmässig durch Stege unterbrochen, Zwischenräume flach gewölbt, doch wie verbeult erscheinend. Dritter und fünfter Zwischenraum mit je 4–5 feinen, schwer erkennbaren Borstenpunkten. Dunkelpschwarzbraun, Flügeldecken mit violettmetallischem Schein, Punkte auf Halsschild und Flügeldecken im Grunde bläulich leuchtend. Fühler und Beine einfarbig rotbraun.

Männchen unbekannt (das typische Stück ist nicht, wie Klug angibt, ein Männchen, sondern, wie ich nach gründlicher Untersuchung feststellen konnte, ein Weibchen).

Weibchen: (Beschreibung nach dem einzigen typischen Stück) achtes Fühlerglied nicht verkürzt. Bauchringe jederseits mit einem lockeren Haarfleck, vor dem Spitzenrand des Afterringes jederseits ein grosser Borstenpunkt und zahlreiche dichtgestellte kleinere Borstenpunkte, der Hinterrand selbst ist leicht ausgeschweift und in der Mitte eingekerbt. Länge 16,5 mm.

BR. GUYANA.* Type ♀ im Berlin Museum . . . *A. picipes* Klug

18 (17). Punkte der Flügeldecken quer, sehr dicht gestellt.

Kopf oval, Hinterkopf verhältnismässig kurz, gerundet verengt, Scheitelgrübchen klein, flach, jederseits ein Borstenpunkt. Halsschild fast breiter als der Kopf, zur Spitze allmählich in flachem Bogen verengt, vor derselben kurz ausgeschweift. Scheibe zerstreut grob punktiert, Mittelkiel und glatter Streifen auf der Scheibe unpunktiert. Seiten der Vorderbrust dicht grob punktiert. Flügeldecken kurz, hinter der Mitte stark erweitert, Spitze schräg doppelbuchtig abgestutzt. Aussenwinkel zugespitzt, Mittel- und Nahtwinkel stumpf. Punktstreifen sehr fein, von queren Punkten gebildet, mässig stark eingedrückt, unregelmässig unterbrochen durch glatte Stege, wodurch flache Längsgruben gebildet werden. Zwischenräume flach und glatt, der 3. und 5. mit je 3–4 Borstenpunkten. Kopf schwarz, Halsschild und Flügeldecken schwarzbraun, letztere mit violettmetallischem Schein. Unterseite schwarz. Fühler und Beine dunkelgelbbraun.

* Ein Exemplar meiner Sammlung, welches mit der Type bis auf sehr kleine Abweichungen übereinstimmt, stammt aus Br. Guyana, während Klug kein Vaterland angeben kann.

Männchen : (Beschreibung nach einem Stück meiner Sammlung aus BRASILIEN : Esp. Santo) Hinterbrustmitte, Trochanter der Hinterbeine und Bauchringe 2–6 in der Mitte lang behaart. Vorder- und Mittelschenkel verdickt, innen lang bewimpert. Schienen einfach. Penis kräftig, Spitzenkopf schaufelförmig, Schaft oben längsgefurcht. Länge 18 mm.

Weibchen (Beschreibung vom einzigen typischen Stück) achttes Fühlerglied kaum erkennbar verkürzt. Unterseite wie bei voriger Art. Länge 16,5 mm.

BRASILIEN : Para ; Esp. Santo. Type ♀ im Museum Berlin.

A. multiplicata Klug.

19 (12). Schenkel rotgelb oder braungelb, Kniee schwarz.

20 (23). Schienen blassgelb, wie die Schenkel, nur die Kniee schwarz.

21 (22). Schlanker Körperbau, Hinterkopf beim Männchen trichterförmig verengt.

Kopf (beim Männchen) langoval, mit gestrecktem Hinterkopf, trichterförmig verengt. Scheitelgrübchen flach, in feine Längsfurche auslaufend. Halsschild schlank, Seiten zur Spitze allmählich in sanftem Bogen verengt, vor der Spitze schwach ausgeschweift. Mittellinie in ganzer Länge fein strichartig eingedrückt und kielartig erhoben, jederseits von einer unregelmässigen Reihe grober Punkte begleitet; an den ebenfalls gekielten Seitenrändern zieht sich eine Doppelreihe solcher Punkte hin. Seiten der Vorderbrust mässig dicht grob punktiert. Flügeldecken schlank, gestreckt, hinter der Mitte erweitert, Spitze schräg doppelbuchtig abgestutzt; Nahtwinkel vorgezogen, an der Spitze abgestumpft, Mittelwinkel stumpf, Aussenwinkel rechtwinklig, spitz. Punkstreifen tief eingedrückt, dicht quer punktiert, oft und unregelmässig durch Stege unterbrochen. Zwischenräume schmal, rippenartig. Borstenpunkte nicht erkennbar. Schwarz, Halsschild meist mit leichtem Erzglanz, Flügeldecken blau, blaugrün oder blauviolett. Unterseite schwarz mit blauem Metallglanz. Fühler einfarbig braungelb; Beine blassgelb mit schwärzlichen Knien und Füßen.

Männchen : Hinterbrustmitte, Hinterhöften, Trochanter der Hinterbeine und Bauchringe 1–6 in der Mitte lang zottig und dicht behaart. Vorderschenkel mässig, Mittelschenkel stark verdickt, innen lang bewimpert. Hinterschenkel einfach. Mittelschienen gewinkelt, innen lang bewimpert, Hinterschienen einfach. Penis sehr kräftig, Spitze schaufelartig geformt. Länge 17–18 mm.

Weibchen : Achtes Fühlerglied nicht verkürzt. Seiten des Hinterkopfes mehr gewinkelt. Unterseite schwach behaart. Länge 17 mm.

PERU ; ECUADOR. Type ♂ in Sammlg. Liebke; ein ♀ im Museum Berlin *A. monticola* Liebke

22 (21). Gedrungener Körperbau. Hinterkopf (des Männchens) nach anfangs gleichlaufenden Seiten gerundet verengt.

Kopf oval, Seiten des langen Hinterkopfes anfangs eine Strecke gleichlaufend, sodann allmählich gerundet verengt. Scheitelgrübchen herzförmig, tief eingegraben, jederseits ein Borstenpunkt, Basis hinter dem Grübchen mit feiner Längsfurche; Seiten spärlich behaart. Halsschild plump, ziemlich breit, zur Spitze im Bogen verengt, kurz vor derselben ausgeschweift, Seiten kurz vor der Basis eingeschnürt. Mittellinie gegen die Spitze eine Strecke kielig erhoben, grösstenteils jedoch verloschen; jederseits eine einfache grobe Punktreihe, am Seitenrand eine unregelmässige, hinten doppelte Reihe grober, ungleich grosser Punkte. Seiten der Vorderbrust grob punktiert. Flügeldecken ziemlich breit, hinter der Mitte erweitert, Spitze schräg

abgestutzt, Nahtwinkel weit vorgezogen, aber abgerundet, Mittel- und Aussenwinkel kurz gewinkelt. Punktstreifen tief eingedrückt, dicht mit kleinen queren Punkten besetzt, oft, namentlich auf den äusseren Streifen, von Querstegen unregelmässig unterbrochen. Borstenpunkte nicht wahrnehmbar. Zwischenräume schmal, rippenartig. Kopf und Halsschild schwarz, Flügeldecken dunkelviolet. Punkte der Punktstreifen im Grunde blaugrün leuchtend. Fühler einfarbig rotgelb. Beine blassgelb mit schwarzen Knien. Bauch schwarz.

Männchen: Hinterbrustmitte, Hinterhüften, Trochanter der Hinterbeine und Bauchmitte vom 1-6. Ring dicht lang gelb behaart, ebenso die Innenseite der Vorder- und Mittelschenkel. Vorder-schenkel mässig, Mittelschenkel stark verdickt; Mittelschienen innen gewinkelt und auf der Spitzenhälfte lang bewimpert, Hinterschienen einfach. Penis robust, Spitze schaufelförmig. Länge 22 mm.

Weibchen unbekannt.

KOLUMBIEN. Type ♂ in Sammlg. Liebke *A. pallipes* Liebke

23 (20). Schenkel rotgelb, Kniee und Schienen schwarzbraun.

24 (25). Ganze Oberseite schwarz, glänzend, ohne jeden Metallschein.

Kopf mit quadratischem Hinterkopf, Scheitelgrube rund, tief eingedrückt. Halsschild so breit wie der Kopf, grösste Breite auf der Basalhälfte, von hier an allmählich zur Spitze verengt, kurz vor der Basis eingeschnürt. Oberseite grob punktiert, dazwischen mit 3 glatten Längsstreifen. Seiten der Vorderbrust grob punktiert. Flügeldecken mässig lang, Seiten hinter der Mitte erweitert, Spitze schräg doppelbuchtig abgestutzt, mit 3 zugespitzten Winkeln, doch ist keiner derselben dornartig verlängert. Punktstreifen sehr fein punktiert, tief eingedrückt, Punkte im Grunde grün leuchtend; die Streifen oft durch Stege unterbrochen; Borstenpunkte nur sehr schwach erkennbar; Zwischenräume gewölbt, glatt. Schwarz, glänzend, die letzten beiden Bauchringe rotbraun. Fühler rotbraun, 3 Basalglieder dunkelbraun, folgende Glieder an der Spitze geschwärzt. Beine dunkelbraun, Schenkel und Füsse rotbraun.

Männchen unbekannt.

Weibchen: Achtes Fühlerglied deutlich verkürzt. Unterseite zerstreut behaart. Länge 20 mm.

KOLUMBIEN. Type ♀ in Sammlg. Liebke *A. jedlickai* Liebke

25 (24). Oberseite schwarzbraun, glänzend, Flügeldecken rötlich durchscheinend und stark irisierend.

Kopf langoval, Hinterkopf mit allmählich gerundet verengten Seiten, Grübchen länglich, flach; Seiten behaart. Halsschild fast in der Mitte am breitesten, zur Spitze ziemlich kräftig verengt, kurz vor der Spitze ausgeschweift. Scheibe mit 4 unregelmässigen Reihen grober Punkte, dazwischen glatte Längsstreifen. Flügeldecken mässig lang, hinter der Mitte etwas erweitert, Spitze schräg doppelbuchtig abgestutzt; 3 kurz gespitzte Winkel. Punktstreifen sehr fein punktiert und eingedrückt, von Stegen oft unterbrochen. Kopf und Halsschild schwarzbraun, glänzend, Flügeldecken ebenfalls schwarzbraun, aber rötlich durchscheinend und auf der ganzen Oberfläche stark irisierend, Punkte der Punktstreifen im Grunde grünlich leuchtend. Unterseite dunkelbraun, Afterring rötlich. Fühler mit 3 Basalgliedern dunkelbraun, Restglieder rotbraun mit dunklen Spitzen. Beine schwarzbraun mit blassgelben Schenkeln.

Männchen unbekannt.

Weibchen: Achtes Fühlerglied nicht verkürzt. Länge 20 mm.

ECUADOR. Type ♀ in Sammlg. Liebke *A. iris* Liebke

26 (1). Spitze der Flügeldecken mit nur 2 Dornen deutlich ausgebildet, der Mittelwinkel fehlt entweder gänzlich oder er ist nur leicht angedeutet.

27 (30). Spitzenrand der Flügeldecken fast gerade, nur schwach doppelbuchtig, Naht- und Aussenwinkel deutlich gezähnt, Mittelwinkel nur andeutungsweise erkennbar.

28 (29). Männchen mit unregelmässig geformtem Penis, Spitze desselben zur Seite gebogen. Weibchen mit verkürztem 8. Fühlerglied. Schwarzbraun, Flügeldecken mit leuchtendem Erzglanz, Beine ebenso, Fühler rotbraun mit schwarzen Gliederspitzen. Länge 14–17 mm.

BRASILIAN : Goyas *A. mira* Liebke

29 (28). Männchen mit regelmässig geformtem Penis, Spitze desselben helmartig geformt, nicht zur Seite gebogen. Achtes Fühlerglied nicht verkürzt.

Kopf langoval, mit ausserordentlich, langem elliptischen Hinterkopf, dieser ohne Spur eines Scheitelgrübchens oder einer Längsfurche, auch unpunktiert. Halsschild ebenfalls sehr schlank, mit 4 in Furchen gelagerten Reihen grober Punkte; Mittellinie gekielt. Vorderbrust glatt, unpunktiert. Flügeldecken schlank, Schultern stark abfallend, hinter der Mitte erheblich erweitert, Spitze leicht schräg, schwach doppelbuchtig abgestutzt. Naht- und Aussenwinkel kurz gedorn, Innenwinkel nur angedeutet. Punktstreifen fein eingedrückt, Punkte sehr dicht gestellt, quer, sehr unregelmässig sind die Streifen durch glatte Stege unterbrochen, manche Streifen gar nicht. Zwischenräume flach, glatt. Borstenpunkte nicht erkennbar. Kopf schwarz, mit leichtem Metallglanz, Halsschild und Flügeldecken schwarz bis schwarzbraun, beide mit starkem Metallglanz, der aber auf den Flügeldecken noch weit stärker auftritt; die Punkte auf der Oberseite sind im Grunde blaugrün leuchtend. Unterseite und Beine schwarz mit Erzglanz; Fühler dunkelbraun mit erzfarbigem Basalglied.

Männchen : Hinterbrustmitte, Trochanter der Hinterbeine und Bauchmitte (Ringe 2–5) fein und dicht behaart. Schenkel kaum verdickt. Schienen einfach. Penis mässig stark, mit grossem, helmartig halbkreisförmigem Spitzenknopf, dessen Hinterwinkel scharf spitz ausgezogen sind. Der Schaft ist der Länge nach oben flach gefurcht, an der linken Seite trägt er einen langen scharfen Einschnitt (Samenleiter?). Länge 13–15 mm.

Weibchen : Achtes Fühlerglied nicht verkürzt.

BRITISCH HONDURAS; PANAMA; KOSTARIKA; MEXIKO. Type ♀ im British Museum *A. claina* Bates

(Hierher gehört auch die mir unbekannte *A. laticolor* Bates).

30 (27). Spitzenrand der Flügeldecken in einer einzigen Flucht stark ausgeschweift, Naht- und Spitzenwinkel lang gedorn.

31 (32). Alle Punktstreifen der Flügeldecken sind ziemlich regelmässig durch Querstege unterbrochen. Kopf und Halsschild gedrunen geformt.

Kopf kurzoval, sehr breit, mit verhältnismässig kleinen Augen. Seiten des Hinterkopfes gerundet verengt; Scheitelgrübchen rund und tief; Seiten und Basis zerstreut punktiert und absteigend beborstet. Halsschild länger als der Kopf, zur Spitze leicht verengt, vor derselben nicht ausgeschweift. Scheibe gegen die Spitze fein punktiert, beiderseits der Mittellinie und an Seiten und Basis grob punktiert. Flügeldecken mässig lang, hinter der Mitte erweitert, Spitze schräg abgestutzt, Naht- und Aussenwinkel lang gedorn. Punktstreifen fein punktiert; auf allen Streifen sind gleichmässig verteilte Gruben tief eingedrückt, in denen die Punktstreifen laufen; der 2., 4. und 6. Streifen tragen jeder eine Reihe von Borstenpunkten, die jedoch wenig auffallen. Schwarz, Mundteile, Fühler und Beine einfarbig rötlichbraun.

Männchen : Vorderbrustfortsatz einfach, ungedorn. Hinterbrustmitte schmal lang behaart. Trochanter der Hinterbeine abgerundet,

lang behaart. Bauchringe 3-5 jederseits mit einer lockeren Gruppe von Haaren. Schenkel nicht verdickt. Hinterschienen leicht gebogen, innen fein bewimpert. Länge 13 mm.

Weibchen unbekannt.

PERU. Type ♂ in Sammlung Liebke *A. setigera* Liebke

- 32 (31). Nur die äusseren Punktstreifen sind regelmässig unterbrochen; der 2. und 4. Streifen tragen jeder eine Reihe grober, in tiefen Gruben liegender Borstenpunkte. Kopf und Halsschild schlank, Hinterkopf fast trichterförmig. Achtes Fühlerglied des Weibchens nicht verkürzt. Länge 12 mm.

ECUADOR *A. foraminosa* Liebke

A NEW GENUS AND TWO NEW SPECIES OF NEOTROPICAL SCARABAEIDAE (COLEOPTERA: MELOLONTHIDAE)

By LAWRENCE W. SAYLOR.

(United States Department of Agriculture, Bureau of Biological Survey.)

Communicated by Sir GUY A. K. MARSHALL, F.R.E.S.

THE present paper describes a new genus and two new species which have been found among a moderately large shipment of Neotropical Melolonthid scarabs sent to me for determination by the Imperial Institute of Entomology, through its Director, Sir Guy A. K. Marshall.

Canestera gen. n.

Form oblong-oval, slightly broader behind. Clypeus with sides straight and convergent apically, apex subtruncate, slightly reflexed. Antennae 8-segmented, club short and 3-segmented. Thorax very convex, a little broader through the rounded median dilation, but nearly as wide through the hind angles; angles very sharp; front of thorax with fine membranous margin; lateral margins not crenulate and all margins with moderately dense, short, yellowish hair. Elytra about one and one-half times longer than thorax, without visible membranous border on lateral margins. Pygidium exposed from above, a little longer than wide, very convex. Spiracle on the suture between the propygidial segment and the 5th ventral abdominal segment, the suture obsolescent apically. Abdomen with six visible segments, the first visible only between the hind coxae. Anterior coxae subconical. Front femora bidentate. Hind femora short and broad, as long as or longer than the tibiae, the latter without any transverse carina, but with short coarse bristles on the outer side and with moderately dense, short, fine hairs on the inner side, but surface of the latter side with dense shallow pits. All tarsi a little longer than their respective tibiae, the claws moderately long and cleft at apex, the middle and hind claws nearly equally cleft, but those of the front tarsi with the lower tooth a little shorter and broader. Hind tibiae a little less than three times longer than width of hind tibiae at apex, with two short acute spurs at apex. Mentum with slight longitudinal furrow.

Genotype: *Canestera marshalli* sp. n.

This very distinctive genus and species resembles in form and superficial appearance the genus *Hoplia*, but does not belong to the same subfamily because of the presence of the two claws and of tibial spurs on the hind-legs in the present genus, as well as the absence of scales on the dorsal surface. *Canestera* is probably nearest to *Anomalochilus* and *Calodactylus*, but differs

from both by many features : from the former, of which I have seen a cotype of the type species, the present genus differs mainly in the type of tarsal claws and in the differently shaped thorax; from *Calodactylus* the genus *Canestera* differs especially in lacking the 9-segmented antennae, the entire hind tarsal claws and the dense dorsal pilosity.

***Canestera marshalli* sp. n.**

Entirely shining black, the claws somewhat rufous. Head with vertex smooth, front and clypeus very coarsely and rugosely punctured, clypeal suture very fine; surface with dense, erect, very short hair. Antennae with 2nd segment globose, 3rd and 4th subequal, and each longer than the 2nd, 5th very small; the stout club very slightly longer than the funicle. Thorax with disc finely, irregularly, not densely punctured, much sparser at centre, the greater part of disc, except for sides, glabrous; lateral margin strongly convergent apically from median dilation, very nearly straight from dilation to the hind angles, the latter very sharp and very nearly acute; front angles rectangular; hind part of thorax not margined and slightly sinuate each side of middle to the hind angles. Scutellum with a few fine setigerous punctures. Elytra finely irregularly punctured, glabrous except for lateral margins and for several very fine, short hairs near sutural angles at apex; the punctures of the elytra arranged in several irregular rows, thus apparently simulating striae, the irregularly spaced punctures, however, of the same size as those in the striae, so that the entire punctuation of the elytra appears quite irregular. Pygidium densely coarsely setigerously punctured, with appressed short hairs, all these pointing marginally towards the centre; pygidium also with a small impunctate area just basally from the centre of the disc, with a very narrow transverse impunctate area immediately adjoining the basal margin. Abdomen with segment 5 longer than segments 2 to 4 combined, segment 6 as long as 5; entire abdomen at centre densely finely punctured, with long, fine, erect hair, the punctuation of the 5th and 6th segments, however, much the denser. First segment of hind tarsi very nearly as long as next two combined. Length 6.5 mm. Width 3 mm.

Holotype and *paratype*, both males, were collected in British Guiana by the Cattle Trail Survey (at Canister Falls, vi.1920, A. A. Abraham); the type has been returned for deposition in the British Museum, while the paratype remains in my collection.

I take pleasure in naming the species in honour of Sir Guy Marshall, who sent the specimens to me.

***Haplodema rufescens* sp. n.**

Robust, oblong-oval, shining rufous to rufocastaneous, glabrous above. Head with front finely moderately sparsely punctured (often very sparsely so and the vertex and centre of front nearly impunctate); clypeal suture fine, angulate at centre; clypeus finely, moderately densely, regularly punctured, apex slightly rounded, a little reflexed, sides very strongly convergent anteriorly, angles strongly rounded. Antennae 9-segmented, 2nd segment large and globose, 3rd and 4th also globose but much smaller, 5th and 6th small but transverse, the 3-segmented club slightly longer than the funicle. Thorax finely, moderately densely, regularly punctured, with a suggestion of a smooth longitudinal median line; front angles acute, hind angles rectangular, base not margined; lateral margin scarcely at all dilated, entire, with a few long cilia. Elytra about twice as long as thorax, finely, not densely punctured, striae except sutural obsolete; lateral and apical borders with a narrow membranous margin. Pygidium transverse, somewhat convex, polished, sparsely punctured near base and sides, centre and apex smooth. Abdomen somewhat convex, highly polished and impunctate except for a single transverse row of fine, sparse, setigerous punctures on each segment near apex; 1st abdominal segment at middle prolonged

towards the head of the insect into a small triangularly-shaped lobe which fits into, and in one specimen even partly covers, the apex of the coxae. Sixth abdominal segment one-half as long as 5th; the latter with part of the lateral abdominal line (characteristic of this and allied Sericini genera) prolonged into a small but obvious lobe which covers a portion of the apical margin of the elytra. Hind tibiae with two groups of large irregular spines on outer side as well as at the apex, the apical spurs very long and quite narrow, the first tarsal segment longer than the second, the tarsi not pilose beneath. Tarsi of front and hind-legs long and slender but with a dense pad of light-coloured hair beneath segments 1 to 4 inclusive, the pads of the front legs a little the widest. Front tibiae tridentate, the upper tooth very small. Mentum slightly convex, very strongly rugosely punctured, with moderately dense short hairs. Coxae strongly conical. Length 10 to 10.5 mm. Width 5 to 5.5 mm.

The type and four paratypes, all males, were collected in British Guiana by the Cattle Trail Survey (A. A. Abraham); the type is from Kurubara Creek, ix.1919, as are 2 of the paratypes. The other paratypes are from Huni Savannah (ii.1919) and from Yawakuri River (Section 3. vii.1919). The type and 2 paratypes have been returned for disposition (type to British Museum) while 2 paratypes remain in my collection.

The species is closely related to *H. paraguayensis* Arrow, from Paraguay, but differs in many essentials, the most obvious of these being the size, geographical distribution and colour pattern.

AÈDES (OCHLEROTATUS) LONGITUBUS, A NEW SPECIES FROM PORTUGAL. (DIPTERA, CULICIDAE) *

By F. J. CAMBOURNAC.

Communicated by Dr. F. W. EDWARDS, F.R.E.S.

IN the course of entomological studies in the Malaria Station at Aguas de Moura, a village situated 20 kilometres east of Setubal, I found in February 1936, in the light brown water left by the rains in the butt of an old cork tree (*Quercus suber* L.), larvae (unmixed with those of other species of mosquito) of *Aedes* sp. which did not correspond to the description of any known Palearctic species. At the beginning of March I again found these larvae, in water of a dark brown tint, like tincture of iodine, in a natural depression in a cork tree, this time in conjunction with larvae of *Aedes echinus* Edw., and later (May 1937) associated with *Aedes echinus* and *Orthopodomyia pulchripalpis* Rond.

The larvae, when first found in February 1936, were practically all in the 4th stage, and in the beginning of March the first adults emerged (♀).

The females were provisionally classified as *Aedes versicolor* Barraud, notwithstanding a difference, principally in the colouring of the mesonotum; hence they would belong to the sub-genus *Finlaya*. As up to the present the larva of *A. versicolor* has not been described, classification is based solely on examination of the females. Unquestionably the cerci of the female are somewhat short, and the 8th sternite is comparatively large and prominent; and the larvae live in water found in tree holes, as do most of the species of this sub-genus.

* From the Station for Malaria studies of the Rockefeller Foundation, Aguas de Moura, Portugal.

I sent some specimens to Dr. F. W. Edwards, who replied as follows :

"The mosquito which you sent is, I think, *Aedes pulchritarsis* var. *berlandi* Séguy.

While it is possible that *versicolor* Barraud may be a synonym, as *berlandi* was described from France and *versicolor* from Kashmir, I think it would be preferable to use the name *berlandi* for your insect."

As seen, then, it belongs to the sub-genus *Ochlerotatus*, but to a group closely related to the sub-genus *Finlaya*, which Edwards considers "comparable to the sub-genus *Finlaya*." Examination of the male revealed that the palpi are about the same length as the proboscis, but the hypopygium has claspettes, and the side-pieces have basal and apical lobes—all characteristic of the sub-genus *Ochlerotatus*.

Examining the larvae and comparing them with the drawings and descriptions of the larvae of *Aedes pulchritarsis* Rond. (Martini in E. Lindner, 1929), I thought I was perhaps dealing with the larvae of *A. p.* var. *berlandi* Séguy (undescribed as yet), but the difference between my larvae and those of the *A. pulchritarsis* form is so great that I began to think it a distinct species.

I sent a number of larvae to Dr. Edwards, and with his usual courtesy he replied :

"The larva looks quite different, especially in the length of the siphon, from other forms described as *pulchritarsis*, so possibly this form *berlandi* should be regarded as a distinct species."

Furthermore, examination of numerous specimens showed the adults of this new species to differ from *A. pulchritarsis* and its var. *berlandi*, amongst other distinctions by the colouring of the mesonotum. Instead of the lateral oval patches of black-brown scales, described by Séguy, our species has lines and patches of white scales. (See description below.)

On the other hand, the coloration of the mesonotum may cause the new species to be confused with *A. pulchritarsis* var. *asiaticus* Edw., but examination of f_3 (femur of posterior pair of legs) will separate these two at once. According to Edwards in var. *asiaticus* the f_3 is completely black on the external aspect.

The larvae are distinguished from *A. pulchritarsis* * principally by the following characters :

A. pulchritarsis :—Siphon index 4 : 1. Ventral hairs of siphon in the middle portion; comb with a series of approximately 9 teeth in a single line; 10th abdominal tergum (saddle) covers only about half of anal segment; gills narrow and approximately same length as saddle.

A. longitubus :—Siphon index $5\frac{1}{2}$ –8 : 1. Ventral hairs of siphon at union of proximal and middle thirds; anal comb with a series of 16 to 20 teeth arranged in a triangle.

The differences, not only in the adults but even more in the larvae, tended to confirm the opinion that the material represented a new species, although related to the *A. pulchritarsis* group by the adult characters, while the differences in the male hypopygium are decisive. In *A. pulchritarsis* and its var. *berlandi* there is only one differentiated spine on the basal lobe of the side-piece, while in the new form there are 3 differentiated spines, 2 of them approximately equal and a little shorter than the other.

Since the larva of the new species has the highest siphon index of any

* The larva of *berlandi* has not been described, and of the forms described as varieties of *pulchritarsis* I only found a description of the larva of var. *stegomyia* Stackelberg and Montschadsky (Martini in Lindner), and with this form the new species cannot be confused.

Aedes species described in the Palearctic region, I propose that it be named *A. longitubus*.

After writing this paper, I had the opportunity of seeing Dr. F. W. Edwards in London, and of examining the specimens of *A. p.* var. *berlandi* kept in the British Museum. Moreover, the type specimens of var. *berlandi* were kindly sent from Paris by Mons. E. Séguy for comparison.

The type specimens of *A. p.* var. *berlandi* are in beautiful condition and it was possible to see with more detail the differences between the two species described above.

The mesonotum of var. *berlandi* has a yellowish appearance due to the large areas occupied by the yellowish scales almost only with one dark brown oval patch on each side, as described by Séguy, whilst in *A. longitubus* the appearance is dark brown with light lines and patches.

The areas of golden scales marked as B in fig. 1 are more yellowish-brown in var. *berlandi* and occupy at least two-thirds of the length of the mesonotum, in *A. longitubus* only about half this length. The median line of white scales forks in front of the scutellum in *A. longitubus*, but not in var. *berlandi*; the two lateral oval white patches are not present in var. *berlandi*.

Although in var. *berlandi* type the hypopygium was not in quite perfect condition, we were able to see that the main spine on the basal lobe of the side-piece is not so well developed as in *A. longitubus*, and the two other curved spines described in the later species are not evident in var. *berlandi*.

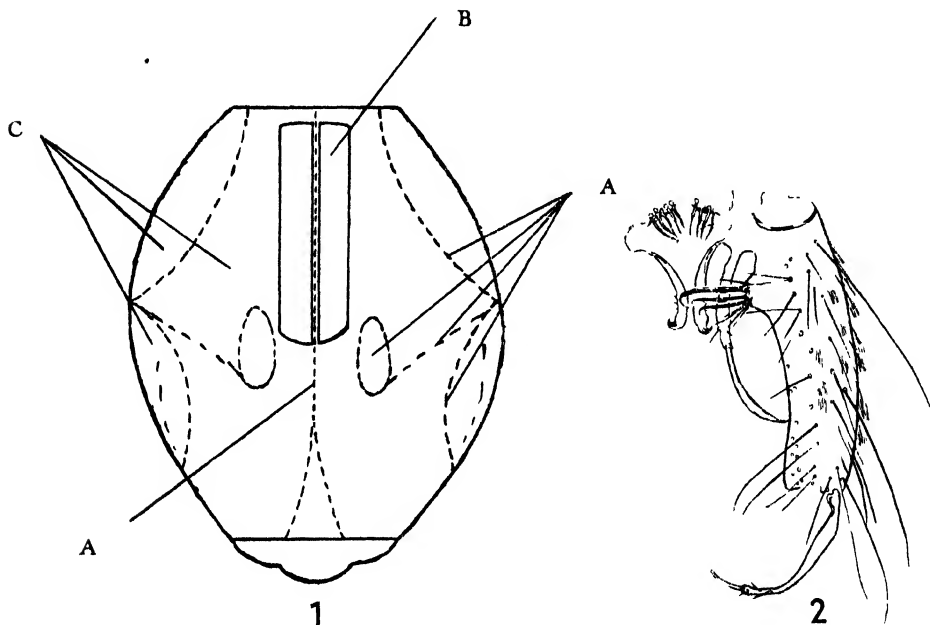
These differences are sufficiently great to prove once more that I am dealing with distinct species.

The differences in the claw formula between *A. longitubus* as described here and var. *berlandi* as described by Séguy, is certainly due to the fact that Séguy described an abnormal specimen.

Aedes (Ochlerotatus) longitubus sp. n.

♀. Head black. Occiput has a triangular area of white or sometimes golden scales (mostly narrow-curved scales, and some forked) in the median part, and with golden hairs in the anterior part. Immediately on either side of this triangle is an area of a few black hairs and dark forked scales; further out a zone of white (narrow-curved) and black (forked) scales, also long black hairs; further still the narrow-curved and forked black scales become less numerous, leaving at the edge solely or almost solely wide, flat, white scales. Row of white, narrow scales, and long black hairs around ocular margins. Eyes black. Proboscis long, and covered with black scales with blue reflections; labella dark brown. *Antennae*:—Slightly longer than the proboscis. Tori very dark, almost black, with an area of large, flat, white scales in the supero-internal aspect; segments very dark brown, almost black, with long shining hairs, brown and goldenish, along the base. They are covered with fine hairs of a light or golden colour, almost transparent, giving them a whitish aspect. Clypeus black. *Palpi*:— $\frac{1}{2}$ of the length of the proboscis, clothed with very dark brown, almost black, scales and black hairs; the tips are covered with white scales. *Thorax*:—Tegument black. Prothoracic lobes ornamented with numerous large, flat, white scales and shining black, and also golden, hairs. Proepimeral lobes with narrow, curved, white or yellowish scales on upper and posterior part; elsewhere white, large, flat scales and golden hairs. *Prosterna*, sternopleura and mesepimera clothed with numerous very broad, silvery-white scales and golden hairs. *Mesonotum* very dark brown, almost black, with the following markings (fig. 1):—A median line of white scales, which extends from the anterior edge to the posterior third, approximately, where it branches into two, forming an inverted V, the arms of which terminate at the edge of the

scutum. On each side of this line, and before bifurcation, two wide strips of golden scales, each strip approximately $\frac{1}{3}$ of the width of the mesonotum. On the lateral parts of the mesonotum a line of white or yellowish scales forming two arcs of a circle which unite on the edge of the mesonotum, at about its middle. The arc of the posterior half of the circle begins above the insertion of the wing, and sometimes thickens before joining the anterior arc. A little behind the junction of the two arcs a line of white scales extends towards the median line, terminating in an oval area, also of white scales (or sometimes



FIGS. 1-2. (1) Schematic outline of thorax to show markings. *a.* white scales; *b.* golden scales; *c.* black or brown scales; (2) *A. (O.) longitubus* sp. n. Male hypopygium.

yellowish, fig. 1). All the rest of the mesonotum covered with very dark brown, almost black scales. All the scales are of the narrow, curved type, the white and yellowish scales being the widest. Long black hairs are scattered all over the mesonotum. In the anterior half, these hairs are almost only on the sides and anterior edge; in the posterior half they are stronger and more numerous, and are especially abundant outside the V formed by the white scales. The scutellum is clothed with white, narrow, curved scales and with strong black hairs. These markings are quite visible in fresh or well-kept specimens, but are easily lost. The postnotum is very dark, almost black. *Wing*:—Veins covered with dark, almost black scales, the fringe scales practically colourless and transparent, the petiole of r_{2+3} approximately $\frac{2}{3}$ of the length of the fork-cell; the petiole of the fork-cell m_{1+2} , from the anterior transverse vein to the bifurcation, approximately $\frac{2}{3}$ of the length of m_2 . The distance between the anterior transverse and the posterior transverse vein greater than the length of the anterior transverse vein. *Halteres* very light, almost white. *Legs*:—Coxae dark brown or black with patches of large, white scales and golden hairs. The other segments are covered with black scales with blue reflections (sometimes the femur and tibia have a few scattered white scales), and with golden hairs. The femora have a ring of white scales on the basal extremity; knee patch overlaps the ends of the two segments, and is composed of long, wide, white

scales. The interior aspect of the proximal half of the femora is completely covered with white or yellowish-white scales. The white scales increase around the joint from the 1st to the 3rd pair of legs, so that, in the last pair, the black part is reduced to a narrow band on the external side. Wide rings of white scales (long and wide) cover the tibio-tarsal articulation as well as the 1st, the 2nd and 3rd tarsal articulations, except the 3rd tarsal joint of the 1st pair of legs. These rings are wider in p_3 , diminishing in p_2 and p_1 . The extremity of the 4th segment of the tarsus has a ring of white scales only in p_3 . In all pairs of legs the 5th segment of the tarsus is completely clothed with white scales. The 4th segment of the tarsus in p_1 is equal in length to the 5th; in p_2 the 5th is $\frac{4}{5}$ of the 4th and in p_3 it is $\frac{3}{4}$ of the 4th. *Claw formula* :—1.1–1.1–0.0 or 1.1–1.1–1.0. *Abdomen* :—Dorsal surface black, covered with blue-black scales; bands of silvery-white scales along the base of the segments; all of equal width. On either side a triangular patch of white scales united by the bands; the tip of the segments has light or yellowish hairs. *Ventral surface* :—Black with two wide patches of silvery scales on either side of the base of the segments. The first abdominal segment has a median area of white scales and gleaming dark brown hairs. The 8th segment is visible from the dorsal surface. Cerci almost black, and short.

Size :—ca. 6 mm.

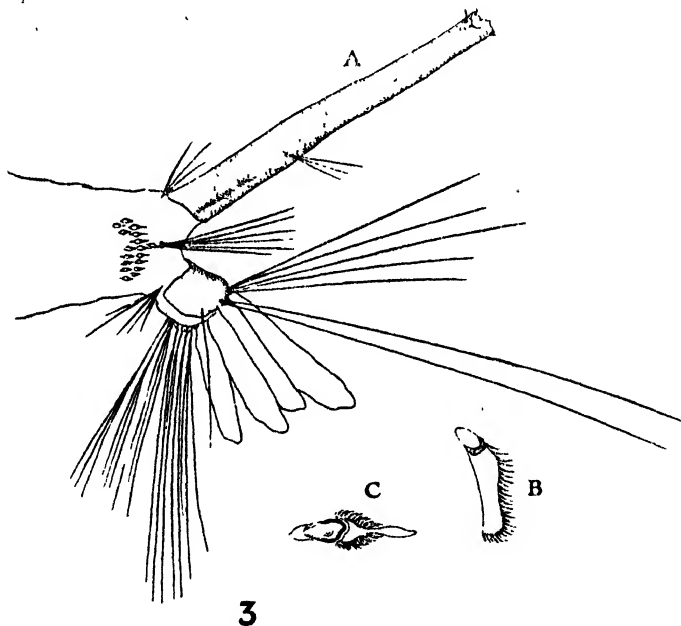


FIG. 3.—A. (*O.*) *longitubus* sp. n. a. siphon, showing location of hair; b. tooth of siphon comb; c. tooth of anal comb.

The species is variable, but presents the characters described, always more or less visible.

♂. Very like ♀ only slightly smaller, ca. 4–5 mm. *Head* :—Like that of ♀, but with a greater number of scales. *Antennae* :— $\frac{4}{5}$ the length of the proboscis. Tori with patch of white scales in the supero-internal part, like the female. Segments with long bristles at the base; the bristles are dark brown and shining, making them appear whitish; the

bristles on the base of the last segment are the same length as that segment. The length of the last two segments is equal to half the length of the antenna, the last one being $\frac{2}{3}$ of the length of the penultimate; the hairs covering the last segment are shorter than those covering the penultimate. *Palpi*:—Of the same length or slightly longer than the proboscis. They are curved downwards at the tips, being also covered with blue-black hairs and scales. The last segment is the only one with white scales, in the proximal third. The 3rd and 5th segments thicken at the tips, while the 4th segment is thick throughout. From the thickened part of the 3rd segment to its tip it is clothed with long, dark brown hairs, with shining or golden reflections, especially so at the end of the last segment, so that the end appears light-coloured. *Wing*:—Petiole of fork-cell r_{2+3} is approximately $\frac{2}{3}$ of the total length of the fork-cell. Petiole of fork-cell m_{1+2} , from the anterior cross vein, is approximately the same length as m_2 . Distance between the anterior and posterior cross veins is greater than the length of the anterior cross vein. *Abdomen* is like that of female, but the stripes are generally wider. *Claw formula*:—1.1-1.1-0.0. All other characters as in ♀. *Hypopygium*:—Side-piece with scales and long, coarse bristles all over its surface, some of which are as long as $\frac{1}{4}$ of the length of the side-piece. Basal and apical lobes not much developed. Basal lobe of side-piece has numerous longish bristles, and 3 distinct spines with recurved tips. One of them is longer and stronger, while the other two are smaller and approximately equal in size. Of these, one is dorsal and the other is ventral to the former. They turn inward perpendicular to the 1st segment of the claspettes (fig.). *Claspers* curved and ca. $\frac{1}{2}$ to $\frac{2}{3}$ the length of the side-piece, widening at the proximal third and gradually tapering to the tip; some thin hairs at end of terminal $\frac{1}{2}$. Spine blunt and $\frac{1}{2}$ of the length of claspers. *Claspettes*:—1st segment is mostly of constant thickness and narrows in the distal eighth; just where it narrows there is a small tubercle with a hair a little coarser than the others, which cover all the surface of the segment. The 2nd segment is curved like a basque pelota bat and is fairly long, ca. $\frac{1}{4}$ longer than the 1st segment. Proximal half is the same width throughout; distal half is thinner, not forming however a distinct wing (almost only a dorsal edge). The total length of the claspettes is about the same as that of the side-piece. *Anal lobe*:—Strongly sclerotised with 3-4 short spines on the exterior (concave) side. Lobe of 9th tergite small with 4-6 spines, 3 in one row and one, the inner one, a little in advance.

Larva. Head:—Rather wider than long. *Antenna*:— $\frac{2}{3}$ of length of head, hairless or with a few fine spicules, especially in the proximal third. Hair on the antenna is found up to half or $\frac{2}{3}$ its length, generally with 2-3 branches, often simple (in one of the specimens 6 branches). Olfactory bulb of Blanchard or tufts of bristles at tip of antenna are absent. Mandibles with hairs; no distinct comb. Large bristles of vertex in line. Formula:—ca. $\frac{6}{9}$ or $\frac{1}{11}$. *Thorax and abdomen*:—With star-shaped tufts, not very coarse, on both dorsal and ventral surfaces. Lateral hairs of thorax are long and coarse. Lateral hairs of abdomen are long and double, up to the 4th segment, shorter and simpler in the other segments. *Abdominal comb*:—Simple sharp-pointed spines, on the average 16 (10-20) approximately equal, forming a triangle; rarely when only 10 may be in a line, but always with some scales out of line. *Siphon*:—Index $5\frac{1}{2}$ -8:1. Siphon entirely black, gradually narrowing in diameter from base to tip. The dark colour of the siphon is in strong contrast to the very light yellow of the rest of the larva, which gives it a characteristic appearance. Whether the water is very light or very dark brown in appearance the colouring of the larva is always the same, although in larvae found in very dark water (as is most usual) the siphon is usually longer. *Siphon comb*:—With from 22-28 weak teeth, wide, short and close together, with numerous microscopic serrations. The teeth are of the same type and increase only slightly in size from the proximal to the distal end. The comb covers about $\frac{2}{3}$ of the surface from the base of the siphon to the ventral hairs. Ventral hairs are 4 branched,

$\frac{1}{4}$ of the length of the siphon, and arising at the junction of the proximal and middle thirds. Dorsal bristles arise near the tip, and are shaped like a hair. Stigma hairs are soft and small. The saddle is almost the same length as the anal segment and envelops more than half of it (fig.). Inner caudal tuft is about 4 branched; $\frac{3}{4}$ the length of the siphon. Unbranched outer caudal bristles are slightly longer than the siphon. Float hairs are not very coarse. *Formula* :—ca. 5 + 3. *Gills* :—Wide, 4 to 6 times longer than saddle.

Egg :—Same type as *A. aegypti*, completely black or blue-black, rough, making ventral and dorsal surfaces appear similar, covered by rather hard protecting shell (I know only the ovipositions made in May under laboratory conditions). *Habitat* :—The larvae were always found during the first months of the year (February), many of them being in the last instar, consequently it seems that this species passes the winter in the larval state. Adults should emerge till the month of May, at which time all water in tree-holes generally dries up. Larvae have only been found in localities of this kind. The ♂♂ were found only in the neighbourhood of the breeding places, but the ♀♀, though in very small quantities, have been found during the month of May in houses and rabbit-pens; some of the females had fresh blood or eggs and blood. Oviposition in the laboratory was observed at this time. The larvae of *Aedes longitubus* sp. n. usually appear together with those of *Aedes echinus* Edw., which hibernates as larvae in this region. Like this latter species they seem to oviposit in summer, the larvae appearing immediately after the first rains (October–November), and remaining in this state until March, when the first adults emerge. Thus, as with *A. echinus*, in this region there can be but one or two generations per year. Nevertheless, by watering (artificially) the tree-holes where they are usually to be found it is possible to observe larvae and adults all the summer.

I am greatly indebted to Dr. F. W. Edwards for classifying the specimens sent, and for other help, and to Dr. Rolla B. Hill for the advice and guidance which enabled me to carry out this work.

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A NEW AFRICAN SPECIES OF *RHAMPHOMYIA* WITH
ABBREVIATED DISCAL VEINS, CLOSELY RESEMBLING
TWO NEW AFRICAN SPECIES OF *EMPIS* SUBG.
COPTOPHLEBIA (DIPTERA EMPIDIDAE)

BY J. E. COLLIN, F.R.E.S.

THE genus *Empis* sens. lat. has always been distinguished from *Rhamphomyia* sens. lat. by the one character of the fork to the cubital vein, and there is a section of the genus *Empis*, in which the species have an abbreviated discal vein, which has been given the name of *Coptophlebia*. Several cases of apparent parallel development in the two large genera *Empis* and *Rhamphomyia* are well known, and the discovery of a new species of *Rhamphomyia* with abbreviated discal veins now recorded adds to the number, but this new species and two others apparently referable to the subgenus *Coptophlebia*, described below, resemble each other in so many characters, except the cubital fork (and a few other characters certainly only specific) that one wonders whether the value of this fork as a primary division has not been over-rated. All three species are rather small (3-3.5 mm.), mainly grey in colour, with clear wings and very pale yellow veins, and mainly yellow legs. Eyes touching on frons in male, but upper eye facets very little larger than lower ones. Face longer than wide. Ocellar bristles very small. Occiput with very few bristles, only a postocular row near eyes on less than upper half, and a second row behind this overlapping it for a short distance, and therefore further from eye-margin, but approaching quite close to eyes below. Labellae of proboscis very long and slender with numerous pseudo-annulations caused by transverse whitish lines. Thorax with comparatively few acrostichal and dorsocentral bristles both irregularly uni- to bi-serial, the former ending at beginning of prescutellar depression, latter uniserial and longer each side of that depression. Prothoracic sternum with 2-4 small bristles above each front coxa, but episterna bare; collar with a row of 6-10 bristles above. Scutellum with only two bristles. A few microscopic hairs beneath edge of postalar callus. Male hypopygium small, upper lamellae dorso-ventrally flattened, side lamellae normally concealed except for its upper margin, the projecting sides of eighth tergite liable to be mistaken for side lamellae, eighth sternite large, penis slender, normally concealed except at tip where it lies within a sheath which is probably an abnormal development of the ventral lamella. Legs with no bristle in "comb" behind tip of hind tibiae. Wings with subcostal vein ending about opposite end of discal cell, fork to cubital vein when present almost at 90° to vein and straight, and the two upper veins from discal cell not reaching wing-margin.

The distinguishing features of the three species are as follows :—

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***Rhamphomyia rhodesiensis* sp. n. ♂ ♀.**

A grey species with mainly yellow legs (partly pennate in female), and with two upper veins from discal cell not reaching wing-margin.

♂. Occiput, frontal triangle and face dull grey, lower margin of face and clypeus shining black. Antennae black, first segment longer than second, which is brownish towards tip, third rather more than twice as long as deep at base, style almost as long as this depth, dark hairs at end of first two segments inconspicuous. Palpi slender, dark on basal half, end part slightly dilated and yellow, a few dark hairs on lower side only. Labrum tawny brown, quite half as long again as head is deep. Thorax uniformly dull grey except for a rounded polished black spot above root of each wing immediately in front of root of supra-alar bristles, and some faint indication of darker stripes down disc on lines of bristles. Humeral and posthumeral bristles fairly well developed, stronger bristles being two posterior notopleurals, a supra-alar, postalar, the posterior dorsocentral, two scutellar and the numerous black metapleural bristles. Intrahumeral bristle very weak.

Abdomen yellowish with slight silvery reflections, side margins of tergites dark brown, and a tawny brown band spreads across base of each segment from second onwards becoming successively broader until seventh tergite is almost entirely brown, the yellow hind margins becoming thus successively narrower. Venter mainly yellowish but becoming greyish-brown towards end and on hypopygium. Pubescence dark, longest at sides, especially on second tergite, very short and scattered on disc and on venter, with some longer bristles towards hind margin of eighth sternite.

Legs yellow, narrowly darkened at tip of each tibia and of each tarsal segment, and some indication of slight darkening towards end of hind femora. No conspicuously strong bristles on femora, or four anterior tibiae; hind tibiae longer and stouter than others with a double row of strong bristles above. Basal segment of all tarsi with some short spines beneath and round tip, that of hind tarsi much stouter and with a pair of bristles on upper side at about middle, and another pair at tip, a pair of similar but shorter bristles at end of second, and still shorter ones at end of third segment. No distinct bristle at base of costa. Squamae and halteres yellow, knobs of latter paler.

♀. Eyes separated by a shining black frons quite as wide as face. Eye facets all equal in size. Thorax similar to that of male. (Abdomen missing in type.) Legs also similar but with more conspicuously darkened end third of hind femora, and some dark pennate fringes, the most noticeable being a spaced row of about 20 broad flat scales (each longer than broad and not quite so long as femur is deep) beneath hind femora, but not extending to extreme base; a few much narrower scales above hind femora just beyond middle; a row of narrow scales beneath hind tibiae from near base to just beyond middle; a similarly placed posteroventral row of still narrower scales on middle femora; and 3-4 very narrow scales beneath front femora just beyond middle. Chaetotaxy of legs otherwise very much as in male; basal segment of hind tarsi not so stout.

Length about 3.5 mm.

Described from three males (one the type) and one damaged female from Salisbury, Southern Rhodesia, taken by Mr. A. Cuthbertson on flowers of *Mentha sylvestris* on 14.xii.1936, and sent by him to the Imperial Institute of Entomology. Type now in the British Museum.

The next two species can be referred only to *Coptophlebia*, but whereas in typical species of that subgenus only the first (upper) vein from discal cell is abbreviated, in the two species described below this is the case with the first two veins, and they otherwise differ in many more characters from typical *Coptophlebia* than they do from *Rhamphomyia rhodesiensis*.

Empis (Coptophlebia) valga sp. n. ♂.

A grey species having yellowish abdomen with silvery reflections, and mainly yellow legs, with peculiar hind knees.

♂. In general appearance remarkably like *Rhamphomyia rhodesiensis*, but differing as follows:—First two antennal segments yellow, style quite half length of third segment. Thorax with no polished supra-alar patch; prothorax, humeri, and postalar calli somewhat yellowish. Thoracic bristles longer, intra-humeral and posthumeral bristles stronger, an additional strong (anterior) notopleural bristle. Abdomen decidedly silvery in some lights, sides of tergites not quite so dark and pubescence rather shorter there except on second and third segments. Legs yellow, with similar dark tips to tibiae and each tarsal segment, but more strongly bristled and all legs stouter; middle tibiae with strong bristles above similar to those on hind pair; front tibiae more weakly bristled except towards and round tip; all tarsi more bristly, especially basal segment of front tarsi, which has three pairs of strong bristles above, and (like that of middle tarsi) more distinct spines beneath. Hind femora just before tip with a strong posteroventral swelling which bears a dense brush of curved shining black bristles. Hind tibiae when viewed from above with an angular bend (in posterior direction) just beyond where femoral brush passes when femora and tibiae are bent towards one another, and distinctly swollen at the angle. A small but distinct black bristle at base of costa.

Length about 3.25 mm.

A single male in the British Museum from Obuasi, Ashanti, West Africa, caught by Dr. W. M. Graham on 4.viii.1907 "on leaf in bush path."

Empis (Coptophlebia) appendiculata sp. n. ♂.

Very much like *C. valga*, but thorax slightly browner, abdomen all dull tawny brown with scarcely any silvery reflections, and hind knees simple.

♂. Colour of antennae and chaetotaxy of thorax as in *C. valga*. Thorax not so grey. Abdomen uniformly dull brown except for very narrow yellow hind margins to tergites. Pubescence more uniform, especially not so long at sides of second and third tergites. Hypopygium apparently very similar, but eighth sternite with a small prominent tubercle at middle near base.

Legs of similar coloration and tibiae and tarsi similarly strongly bristled. Hind femora and tibiae simple, but femora with distinctive bristles as follows:—3-4 very long bristles in front just beyond middle, preceded by a row of 4-5 bristles, which become shorter towards base of femur; posteroventrally with a row of bristles, of which the first 2-3 near base are long and fine, those just beyond middle shorter and a little stronger, at which point (opposite the long bristles in front) the row ends abruptly. Hind tibiae with a posteroventral fringe of bristly hairs, longest about base. Wings and halteres as in *C. valga*.

Length about 3 mm.

Two males in the British Museum also from Obuasi, Ashanti, and captured by Dr. W. M. Graham, one "on book, in verandah" on 1.v.1906, the other "in bush 5 p.m." on 3.x.1907.

The *Coptophlebia chrysocera* from Tanganyika Territory described by me (1930, *Proc. R. ent. Soc. Lond.* (B) 4: 100), though very different in general appearance and structure of male prehypopygial segments, has labellae of proboscis similar to all three species described above, and similar wing venation.

A NEW SPECIES OF *PIPUNCULUS* (DIPTERA) FROM SICILY

By J. E. COLLIN, F.R.E.S.

Pipunculus zernyi sp. n. ♀.

A species of the *sylvaticus*-group easily distinguished by the conspicuous dense pale pubescence on thorax and disc of scutellum.

♀. Frons wide, as wide at ocellar triangle as above antennae and wider at middle. Face rather narrower than front of frons. Occiput prominent, dusted greyish except on upper front part (behind ocellar triangle), where it is polished black like upper part of frons; this shining part of occiput is continued sideways for a short distance behind each eye-margin and down each side of frons to nearly half-way to antennae leaving the concave middle line of frons dusted greyish like the front half, the dusted middle line ends a short distance in front of front ocellus. Antennae with rather long pointed third joint covered with silvery pile.

Thorax dusted greyish except perhaps across middle towards behind. Humeri pale yellow. Long dense pale pubescence is present on humeri, on disc of thorax (except for a middle line and a patch between dorso-central and supra-alar lines of hairs), and on scutellum.

Abdomen shining black with dusted side patches to tergites, and universally and densely clothed with pale pubescence, shorter than that on thorax. Hypopygium shining black with a straight yellowish aculeus longer than the globular basal part, its point reaching end of third segment.

Legs black, dusted greyish, with extreme tip of femora and tibiae, and base of tibiae, yellowish; tarsi tawny yellow with darker last joint. Femora all rather stout and clothed with pale hairs; four anterior femora and hind trochanters with 1-2 very small yellowish bristles beneath at base. Ungues and pulvilli long.

Wings clear and with usual venation of this group. Halteres yellow.

Length about 3.5 mm.

Described from a female in the Vienna Museum taken by Dr. Zerny in Sicily (Isola d. Femine) on 17th May, 1921.

ON THE PRESENT STATUS OF *VINDULA* (*CYNTHIA* AUCT.) *EROTA*
(FAB.) AND *V. ARSINOË* (CR.) (LEP. RHOP., NYMPHAL.)

By W. ROEPKE, Ph.D.

(Wageningen, Holland.)

Communicated by Dr. A. S. CORBET, F.R.E.S.

THE late Mr. Fruhstorfer in 1912 (Seitz, 9: 475 *et seq.*), as well as in several previous publications, distinguished between the western *V. erota*-forms and the eastern *V. arsinoë*, chiefly on account of the male genitalia. These appendages (figs. 1, 2), already described and figured by van Eecke (1914, *Notes Leyden Mus.*, 36: 230, fig. 4), are fairly simply built, the dorsal portion, tegumen + uncus (teg, unc), showing no peculiarities, beyond a conspicuous scaphium (sca) which supports the large anal papilla (an. p). The claspers (valvae, va) are simple in shape and, as in many other Nymphalids, they bear a dorso-basal process which is forceps-like (fo), consisting of a pars superior (p.s.) and a pars inferior (p.i.). The p.s. is strongly sclerotised, the p.i. is weaker, its inner side becoming membranous and not always clearly visible in balsam mounts. The real base of the va shows a conical, hairy structure, which I call penicillium (pe). The aedeagus (aed) is slightly bent at its distal orifice, and dorsally, some paired cuticular structures, like small teeth, etc., are visible.

Fruhstorfer (*loc. cit.*) states quite correctly that in the western "*erota*"-forms, the p.s. is strongly bent downwards, whereas in the eastern "*arsinoë*" it is distinctly straight. He includes under "*erota*" all the races of *Vindula* from India, Malaya, Sumatra, Java, Borneo, Celebes and the Philippines, those of "*arsinoë*" being confined to the Moluccas (Amboina), etc. This separation, however, is not entirely in accordance with the facts. When dissecting a large number of male *Vindula* from very different western and eastern localities, the situation appeared as follows:

(1) All the *Vindula* ♂♂ from Ceylon, India, the Himalayas and Siam which I investigated show the p.s. distinctly bent downwards, so they may be considered as *V. erota* forms or closely allied species.

(2) In Malaya, Sumatra, Java and Borneo, both the species *V. erota* (p.s. curved downwards) and *V. arsinoë* (p.s. straight) occur.

(3) From Celebes, the Moluccas and the Philippines I found only *V. arsinoë* (p.s. straight).

From these results, it becomes clear that Malaysia is inhabited by both species. In Java and Sumatra, the ♂♂ may be distinguished at once, the ♂♂ of *V. erota* being very short-tailed or even tailless, whereas the *V. arsinoë*-♂♂ are distinctly tailed. I have examined about 100 males from these two islands; unfortunately the females are very scarce, and my material is so limited that they cannot be considered here. Furthermore, it may be stated that *V. erota* in Sumatra, Java and Borneo prefer the higher elevations (*viz.* above 1000 m.), whereas the *V. arsinoë*-forms are limited to the lowlands, being met with even at the shore. But this rule is not without exceptions; I have some Javan and

Sumatran *V. erota*-♂♂, caught in the lowlands and even near the coast; on the other hand, I have seen (or possess) *V. arsinoë*-♂♂ from higher elevations, occasionally even more than 1000 m.

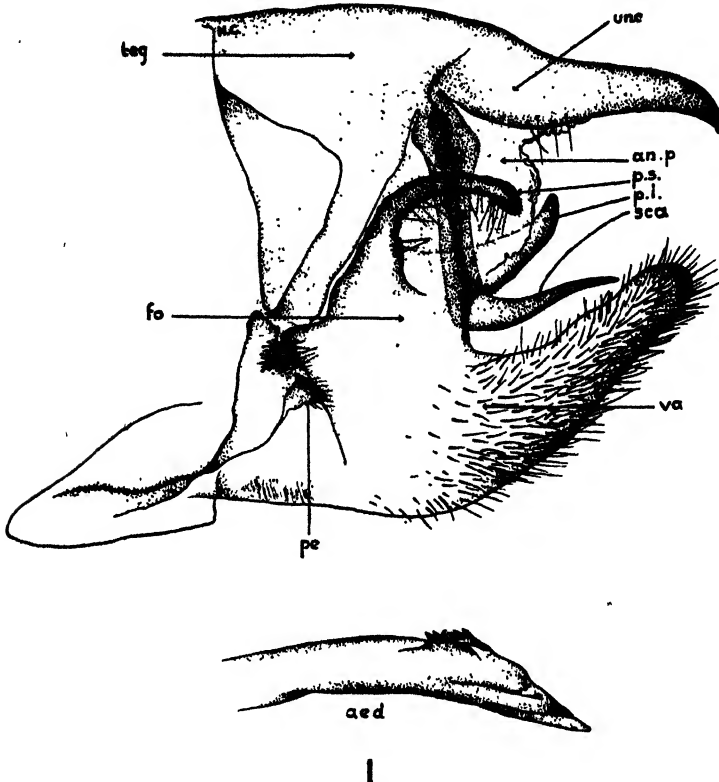


FIG. 1.—♂-Genitalia of *Vindula erota gedeanus* Fruh. from Java (mountains).

The more important *Vindula* races from southern Asia are therefore as follows :

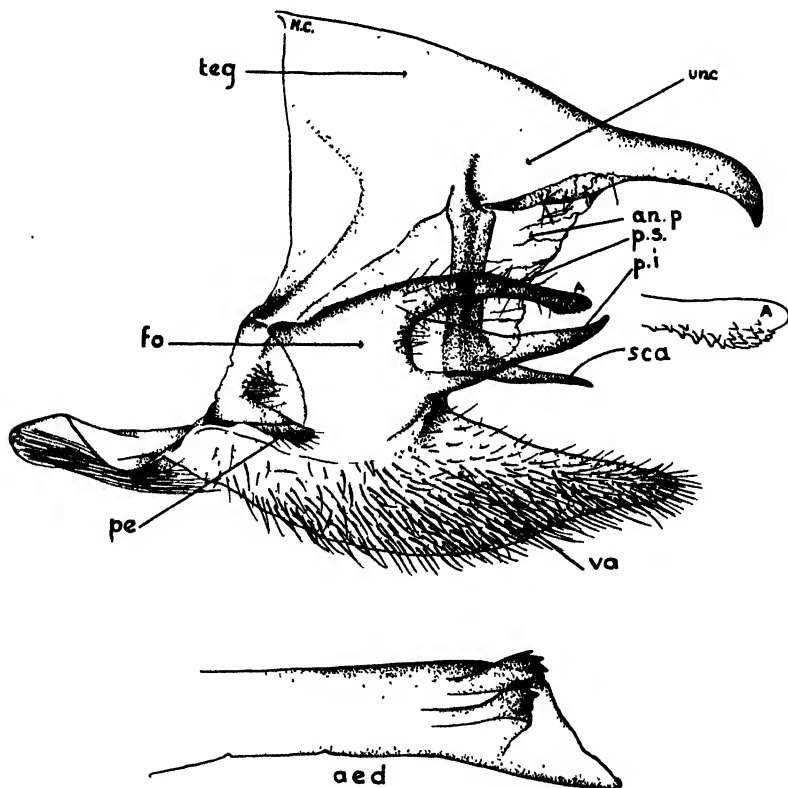
<i>V. erota asela</i> Moore : Ceylon.	<i>V. arsinoë erotella</i> But. : Malaya.
<i>V. e. saloma</i> Swinh. : S. India.	<i>V. a. erotoides</i> Nic. : Sumatra.
<i>V. e. erota</i> F. : Siam, Burma, Sikkim.	<i>V. a. javana</i> Fruh. : Java.
<i>V. e. battaka</i> Mart. : Sumatra.	<i>V. a. dajakorum</i> Fruh. : Borneo.
<i>V. e. montana</i> Fruh. : Borneo.	<i>V. a. celebensis</i> But. : Celebes.
<i>V. e. gedeanus</i> Fruh. : Java.*	<i>V. a. arsinoë</i> Cr. : Amboina.
	<i>V. a. deione</i> Erichs. : Luzon (Philippines).

I have dissected males of all the above-mentioned insects, with the exception of *V. erota montana* Fruh., of which, however, I have seen a large series. Furthermore, I have prepared slides of several eastern "species" from the

* There is also an undescribed subspecies from Malaya.

Molucca and the Papuan region, and find that they all belong to the eastern *V. arsinoë* type.

Finally, it may be mentioned that the different "races" or "subspecies," both of *V. erota* and of *V. arsinoë*, show some differences as to the armature of the aedeagus, the shape of the penicillium, the length of the uncus and the



2

FIG. 2.—Genitalia of *V. arsinoë javana* Fruh. from Java (lowlands).

teg = tegumen; unc = uncus; an. p. = anal papilla; fo = forceps; p.s. = processus superior; A the same enlarged; p.i. = processus inferior; sca = scaphium; va = valva; pe = penicillium; aed = aedeagus.

breadth and the length of the valva. Further investigations on a larger scale may throw more light on the question as to which "forms" may be treated as "subspecies" only and which may be considered as distinct species.

I wish to acknowledge the considerable assistance given me by the authorities of the British Museum (Natural History), the Tring Museum, the Vienna Museum, the Buitenzorg Museum, the Leiden Museum, by Dr. A. Steven Corbet and several correspondents in the Far East.

TWO NEW INJURIOUS PHYTOPHAGA FROM NYASALAND (COLEOPT.)

By G. E. BRYANT, F.R.E.S.

(*Entomologist, Imperial Institute of Entomology.*)

EUMOLPINAE.

Rhembastus coffeae sp. n.

Subelongate fulvous, with aeneous reflections, the elytra punctate-striate, the prothorax bronze with irregular punctures. Legs and antennae testaceous, the terminal segment of the antennae fuscous. L. 4 mm.

Head slightly bronze with aeneous reflections, the clypeus rugosely punctured, the vertex almost impunctate, at the base a median longitudinal impression. Antennae testaceous, extending nearly to the middle of the elytra, the 1st segment more dilated than the following, the terminal segment fuscous. Prothorax transverse, bronze, irregularly and not closely punctured, its sides slightly contracted towards the front. Scutellum bronze, impunctate. Elytra fulvous with aeneous reflections, finely punctate-striate, the shoulders and interstices between the striae impunctate, the interstices at the sides slightly costate. Legs testaceous, the femora feebly toothed. ♂ with 1st segment of front tarsi more dilated. Underside fulvous, the ventral segments of the abdomen paler and less metallic than the sternum.

NYASALAND: Misuku, 21.x.1929, iv.1930, 4000-5000 ft. (*C. Smee*).
Feeding on coffee stems. Described from 11 specimens.

Type in British Museum.

Somewhat closely allied to *Rhembastus natalensis* Lef., but differs in its larger size, the head and prothorax more metallic, and the elytral striae with the punctures much finer.

GALERUCINAE.

Monolepta (Candezea) gossypii sp. n.

Oblong, with the apex of the elytra rounded, pale olive green, with the head and prothorax pale yellow, the eight terminal segments of the antennae and the tarsi black. Prothorax transverse, feebly punctured, the elytra finely and closely punctured. L. 5 mm.

Head pale yellow, the clypeus impunctate, the base of the head finely punctured, a transverse impression behind the insertion of the antennae. Eyes large and prominent. Antennae with the three basal segments yellow, the eight terminal segments black, the basal segment the longest, about equal to the second and third together. Prothorax pale yellow, transverse, very feebly punctured, the sides nearly straight, tapering slightly towards the front, the anterior angles oblique. Scutellum pale yellow, triangular, and impunctate. Elytra pale olive green, oblong and rounded at the apex, closely and finely punctured, with traces of two fine striae on each. Legs with the femora pale olive green, the tibiae pale yellow and pubescent, the tarsi black, the first segment of the hind tarsi very long. Underside pale yellow, clothed with very fine pubescence, the ventral segments of the abdomen about equal to each other.

NYASALAND: Nkwale, 9.xii.1936 (*C. Smee*). On Ratoon Cotton.
Described from 9 specimens.

Type in the British Museum.

Allied to *M. goldingi* Bry., but differs in its larger size, the colour slightly greener, and the antennae and tarsi black.

ORTHOPTERA COLLECTED IN THE ATLAS MOUNTAINS, MOROCCO,

1934-1936. PART 1

By K. H. CHAPMAN, B.A., F.R.E.S.

WITH ONE TEXT-FIGURE.

(With two notes by Dr. B. P. UVAROV.)

THIS paper is based on three collections (now all in the British Museum) made in French Morocco in 1934, 1935, and 1936. While in Morocco in the summer of 1934 with the Cambridge University Freshwater Biological Expedition (which was supported by the Percy Sladen Trust) I was encamped by the side of Lake Sidi Ali ou Mohammed, in the Middle Atlas Mountains, and I was able to make a small collection of Orthoptera. Later camps were at Ouiouane and by the Oum er R'bia falls in the Middle Atlas, and among the foothills of Ari Ayachi, or Ayashin, as it is variously called, the highest range of the eastern Great Atlas. I ascended the highest point, Djebel Ayachi (13,500 ft.), but found few insects, and no Orthoptera, above the tree-line, which is about 7000 ft.

The collection made in 1934, although small, was very interesting; besides furnishing new information on the distribution of several species, it contained a new species of Tettigoniid, *Uromenus chapmani* Uv. (described in this paper), which was almost the commonest large insect at Sidi Ali ou Mohammed, not an inaccessible locality and one visited previously by lepidopterists. This led me to think that more intensive collecting, and visits to less known parts of the Atlas, might be highly profitable.

In the following year I visited Morocco again, to collect for the British Museum, especially to survey the Orthopterous fauna, and to carry out observations on the life-history and occurrence of the Moroccan locust, *Dociostaurus maroccanus* (Thunb.). Owing to a misunderstanding, I was not able to leave until late in August, too late for the third object, and a little too late for many Orthoptera. Funds also did not permit of extensive travelling or of reaching the Great Atlas in the south. At the same time, many interesting points came to light, and among the collections were long series of a new and most interesting short-winged Acridiid, *Omocestus maroccanus* Chapman, described by me in another paper (1937, *Ent. mon. Mag.*, 73: 127-129), and, from the same locality, a short-winged *Calliptamus* subsequently described by Chopard (1936, *Bull. Soc. Sci. nat. Maroc*, 16: 177-178) as *C. montanus* (see below).

In June 1936, with Mr. G. A. Bisset, I visited the western Great Atlas, to collect for the British Museum. Collections were made in the Great Atlas south of Marrakesh, at Ijoukak, Mouldirt, and Tizi N'Test, visits were made to Ourika and Amizmiz from Marrakesh itself, considerable collecting near Marrakesh was done, one day's visit to Taroudant, south of the Great Atlas, was made, and finally a few days' collecting was undertaken in the Middle Atlas, at Sidi Ali, Azrou, and Ras el Ma, to compare the June fauna with that of July-August, as observed in 1934, and August-September 1935.

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As collections were made in 1934 in July and August, in 1935 in late August and September, and in 1936 in June, some information on seasonal occurrence might be expected, and many differences in the Orthopterous fauna were actually evident. Thus, of the species mentioned above, *Uromenus chapmani* Uv., literally hundreds of thousands of individuals were to be seen at Sidi Ali in July, whereas in September 1935 only two females of this species were found in the same locality, and in June 1936 only a single immature female was taken.

No previous records exist for Orthoptera from the eastern Great Atlas, and a large proportion of species are here recorded for other regions, especially south-west Morocco (Taroudant), for the first time. Of the 79 species noted in this paper, over half were previously unrepresented from Morocco in the British Museum collection, and of those already in the Museum collection, most were represented only by an odd specimen or two, the majority having been collected by M. Rungs of the Institut Scientifique Chérifien at Rabat. About a dozen species were completely new to the Museum collection, and nine species are recorded for Morocco for the first time. The present paper includes one new species, and a description of a Moroccan subspecies of *Sphingonotus coeruleans* (L.)—the first record of this species south of the Mediterranean. In addition, a number of new species seem to be represented by a few specimens. These I have decided not to describe until more material has been collected.

Bolivar (1914, *Mem. R. Soc. Esp. Hist. nat.* 8: 165-238) recorded 206 species of Orthoptera for Morocco; Chopard (1927, *C.R. Ass. franç. Av. Sci.* 51: 274-277) gave 230; Uvarov (1927, *Bull. Soc. Sci. nat. Maroc*, 7: 199-215) added 11 species; Werner (1929, *SitzBer. Akad. Wiss. Wien*, (1) 128: 167-188) added 4; Uvarov (1930, *loc. cit.* 10: 210-214) 3; Uvarov (1935, *loc. cit.* 15: 1-4) 2; Chopard (1936, *Bull. Soc. Sci. nat. Maroc*, 16: 151-179) 19; Chapman (1937, *Ent. mon. Mag.* 73: 127-129) 1; Chapman (1937, *loc. cit.*: 157-159) 1; the present paper thus brings the number of species known to inhabit Morocco to 272.

As is to be expected, most of the species of Orthoptera taken in Morocco have predominantly Palaearctic affinities, with some African elements such as *Oxythespis*, and other forms of Afro-Asiatic distribution such as *Polyphaga*, while a few genera such as *Phaneroptera* extend over the greater part of Europe, Asia, and Africa. At the same time, the affinities of certain species with near-eastern groups are notable, e.g. *Omocestus maroccanus* Chapman from the Middle Atlas, and *O. nanus* Uv. from Asia Minor.

Chopard (1927, *loc. cit.*) states that the "Mediterranean" fauna of Algeria extends throughout the littoral region, and spreads south to various points, depending on local climatic conditions—almost to desert at, for example, Biskra, Bni-Ounif, and Ain-Sefra. The mountain region does not differ vastly from the littoral fauna, according to Chopard, but some groups, particularly the Sciobiæ EPHIPPIGERINÆ, and PAMPHAGINÆ, show interesting features, such as the replacement of one species of Pamphagian by another according to altitude in the Djurdjura (Werner, 1914, *SitzBer. Akad. Wiss. Wien*, 123: 368). Unfortunately, the PAMPHAGINÆ are in too confused a state for any conclusions to be drawn from their distribution, as even correct identification is impossible at present. But further collecting of EPHIPPIGERINÆ may well reveal a similar state of affairs to that described by Werner for the PAMPHAGINÆ. Many restricted, but locally abundant forms, such as *Uromenus chapmani* Uv., may be found in the numerous upland meadows of the Middle Atlas when these are more fully collected.

Chopard (*loc. cit.*) remarks that the mountain fauna of north Africa passes

into that of the desert, but that owing to the mountain barrier, the enrichment of the desert fauna from the north has been slight; the desert fauna has few connections with that of the Mediterranean coast, and more with that of Arabia and Transcaucasia, many elements having been derived from eastern Mediterranean and central Asian sources, such genera as *Eremiaphila*, *Platypterna*, etc., being characteristic of both steppe and desert. Thus the record below of *Eremiaphila denticollis* Luc., from north of the Great Atlas Mountains, is of considerable interest. On the whole, the fauna of the eastern Great Atlas, when adequately explored, might be expected to contain other forms with desert relationships as opposed to the more purely "Mediterranean" fauna of the western Great and Middle Atlas.

In concluding, Chopard remarks that the fauna of North Africa in general is more rich in the west than in the east, in particular the desert fauna and those groups which have many representatives in north Africa—out of the 230 species he records for Morocco, he states that only 110 are found in Algeria. This conclusion would be borne out by my results, but as I was able to do far more collecting in the west in 1936, when my time could be wholly devoted to entomology, than in the east in 1934, when entomology had necessarily to be only a side-line, this evidence is not decisive. Chopard says: "La faune étant plus riche dans l'Ouest, comme si les migrations avaient amené une concentration des espèces dans cette région." But besides the comparative abundance of species in the west of Morocco as compared with the east, one may in some cases observe an apparently greater range of variation in the highlands than occurs in the adjoining (eastern) plains in north-west Africa. Thus, one may compare the variation in colour of *Thalpomena algeriana* (Luc.), referred to below, in Morocco and western Algeria, with its constancy in one form in the eastern semi-desert and littoral of Algeria. This kind of variation could hardly be explained by "concentration" of westerly migration. Possibly, in a highland region such as exists in Morocco, species tend to become separated into local groups more easily than in a flat "continuous" country, and small variations thus preserved and inbred (cf. Thomas, 1936, "Cosmic Rays and the Origin of Species," *Nature*, 137: 51 *et seq.*). But unfortunately, in connection with the particular case cited (*Thalpomena algeriana* (Luc.)), so little is known about the nature of coloration in the wings of ACRIDIDAE, and its variation, that one could draw no conclusions of much value without considerably more data.

Of the mountain-dwelling forms noted in this paper, nearly one-third are brachypterous or wingless in one or both sexes. The newly-described brachypterous species *Calliptamus montanus* Chop., *Uromenus chapmani* Uv., and *Omocestus maroccanus* Chapman all appear to exist only at altitudes of 6000 ft. or more.

In order to avoid unnecessary repetition, the details and heights of the localities collected are not repeated but are given in full below: "Sidi Ali" refers to Aguelman (= Lake) Sidi Ali ou Mohammed, Middle Atlas Mountains, 6500 ft. There are a number of small, highly-perched lakes in the Middle Atlas referred to by the term "Aguelman." They are found in volcanic or karstic localities, and often occupy craters or poljes. Sidi Ali is such a lake, in limestone and volcanic country. The vegetation is nearly "semi-desert" and contains such characteristic genera as *Anthyllis* and *Helianthemum*. The lake borders on degenerating cedar forest. Timhadit, 5000 ft., is a small village in the Middle Atlas, about 14 miles from Sidi Ali. Specimens were collected on flat land bordering the river Guigou, and in the volcanic gorges through

which the river flows. Azrou, 4400 ft., is a small town in the Middle Atlas, surrounded mainly by thick cedar forest. Specimens were collected here on pasture land at the edge of the forest, the *Sciobiae*, of course, being found under stones. Ouiuane, 3000-4000 ft., is a clearing within thick cedar forest in the Middle Atlas. Oum er R'bia, 3000-4000 ft., is a glade in evergreen oak forest in the Middle Atlas, with large falls.

The Orthoptera from "Ari Ayachi" were mainly taken in gullies or small valleys with a mixture of cedar and evergreen oak, running through the foothills of this range of the eastern Great Atlas. A few were also taken in the "meseta" or semi-desert country between the Middle and eastern Great Atlas.

Ourika, 2925 ft., and Amizmiz, 3250 ft., are villages in the western Great Atlas foothills not far from Marrakesh. The country is fairly well covered, at least in parts, by oak and "argan" trees. Similar, but thicker, forest is found at Ijoukak, 3900 ft., and Mouldirt, 5360 ft., in the Great Atlas south of Marrakesh, but in these two localities most of the Orthoptera were collected in rocky and barren spots. Farther south is Tizi N'Test, 7150 ft., a wind-swept pass on the face of the Great Atlas, looking down to the valley of the Sous river in the south, in which valley lies Taroudant, 820 ft., in the southwest, south of the Great Atlas.

French spellings of Arabic and Berber names of localities have been used, as they are the ones used on most maps, and so confusion may be avoided.

The papers referred to are as follows :

- "Bolivar 1914": I. Bolivar, 1914, *Dermápteros y Ortópteros de Marruecos*, *Mem. R. Soc. Esp. Hist. nat.* 8: 165-238.
- "Uvarov 1927": B. P. Uvarov, 1927, Notes on Orthoptera from Morocco, *Bull. Soc. Sci. nat. Maroc*, 7: 199-215.
- "Werner 1929": F. Werner, 1929, *Wissenschaftliche Ergebnisse einer zoologischen Forschungsreise nach Westalgerien und Marokko (II. Teil)*, *SitzBer. Akad. Wiss. Wien (Math.-nat.)* (I) 138: 167-188.
- "Chopard 1936": L. Chopard, 1936, Contribution a l'Étude de la Faune des Orthoptères du Maroc, *Bull. Soc. Sci. nat. Maroc*, 16: 151-179.

All other references are given in full.

I am greatly indebted to Dr. B. P. Uvarov for much help and advice, for naming the 1934 collection while I was still at the University, and for examining several new species; also to Dr. Max Beier, of the Vienna Museum, for identifying many of the MANTIDAE; and to Dr. L. Chopard, of the Paris Museum, for identifying some of the GRILLIDAE and for confirmation of those identified by me.

BLATTIDAE.

1. *Periplaneta americana* (L.). Taroudant, vi.1936, 2 ♀♀. Taken inside the Taroudant "Hotel."
2. *Polyphagina algerica* (Br.) var. *occidentalis* (I. Bol.). Taroudant, vi.1936, 4 ♂♂. Taken at light.

MANTIDAE.

3. *Eremiophila denticollis* Luc. Between Midelt and Ari Ayachi, viii.1934, 2 ♀♀. This seems to be the only record of this species occurring in Morocco. Giglio-Tos (1927, MANTIDAE, *Das Tierreich*, 50:53) gives its distribution as Algeria, Tunisia. The other specimens in the British Museum, three in number, are all from Tunisia. It is interesting to find this desert form in the

Atlas Mountains at all. My specimens were collected in the semi-desert "meseta" country between Midelt and Ari Ayachi, that is, between the Middle and Great Atlas, but very much nearer to the latter. It will be noted that this species has not been found in any other part of Morocco, and its occurrence north of the Ayachi range suggests that other desert forms may possibly be found in the semi-desert country immediately north of the eastern Great Atlas.

4. *Ameles africana* I. Bol. Marrakesh, Ijoukak, Mouldirt, vi.1936, 2 ♂♂, 2 ♀♀. Giglio-Tos (*loc. cit.*: 160) gives the distribution of this species as Morocco, Sardinia, and Spain. Chopard (1936: 162) records it from Tinnel (near Ijoukak) and Ouaounzet (Le Cerf and Talbot). The only other specimen in the British Museum is a male from Taddert (Rungs, 1934). 2 *Ameles* nymphs from Tizi N'Test (vi.1936) probably belong to this species.

5. *Ameles maroccana* Uv. Ari Ayachi, 1934, 2 ♀♀. Described by Uvarov (1930, *Bull. Soc. Sci. nat. Maroc*, 10: 210) from Ifrane, Middle Atlas. Uvarov's type and paratype, both females, in the British Museum, are apparently the only other specimens known. The known range of this species is thus now shown to extend to the eastern Great Atlas as well as the Middle Atlas. Both my specimens are females, so that the male is still unknown.

6. *Oxyothespis maroccana* I. Bol. Taroudant, vi.1936, 1 ♂. Recorded by Bolivar (1914) from Mogador. Not previously in British Museum collection.

7. *Mantis religiosa* L. Tangier, ix.1935, 1 ♂.

8. *Iris oratoria* (L.). Ari Ayachi, viii.1934, 1 ♂, 1 ♀. Recorded by Bolivar (1914) from Mogador, Mellila, and Tangier, and by Uvarov (1930) from Asni (western Great Atlas), this Mediterranean species is thus shown to have a wide range in Morocco.

9. *Rivetina fasciata* (Thunb.). Ari Ayachi, viii.1934, 1 ♂, 1 ♀. Ijoukak, Mouldirt, vi.1936, 7 nymphs. Not previously in the British Museum collection; Giglio-Tos (*loc. cit.*) gives its range as "Mediterranean basin."

10. *Geomantis larvoides* Pant. Sidi Ali, ix.1935, 1 ♀. Recorded by Bolivar (1914) from the western Great Atlas, but not previously from the Middle Atlas.

GRYLLOTALPIDAE.

11. *Gryllotalpa* sp., probably *G. africana* Beauv. Oum er R'bia, viii.1934, 1 nymph.

GRYLLIDAE.

12. *Gryllus campestris* (L.). Sidi Ali, viii.1934, 1 ♀. Sidi Ali, vi.1936, 9 ♂♂, 3 ♀♀. Mouldirt, vi.1936, 1 ♀. Most of the Moroccan specimens I have collected agree with the observations of Chopard (1936) in being of large size, with tegmina and wings reaching to the extremity of the abdomen, and the males having very large heads.

13. *Gryllulus domesticus* (L.). Mouldirt, vi.1936, 1 ♂, 1 ♀. Taken outside.

14. *Gryllulus burdigalensis* (Latr.). Taroudant, vi.1936, 2 ♀♀.

15. *Gryllulus algericus* (Sauss.). Ras el Ma, vi.1936, 1 ♀. Not previously in the British Museum collection.

16. *Lissolemmus (Mesolemmus) uvarovi* I. Bol. Sidi Ali, vi.1936, 3 ♂♂.

17. *Lissolemmus* (s.str.) *azruensis* (I. Bol.). Ras el Ma, vi.1936, 3 ♂♂.

18. *Sciobia finoti* Br. Ourika, vi.1936, 1 ♂. Recorded by Werner (1929) from Azrou, and now shown to extend into the west of Morocco as well as the

east and into the Great Atlas as well as the Middle Atlas. Not previously in British Museum collection.

19. *Sciobia chevrouxi* I. Bol. Azrou, vi.1936, 7 ♂♂, 7 ♀♀. Mostly taken in couples (♂ and ♀ together) under stones.

20. *Sciobia caliendrum* (Fisch.). Azrou, vi.1936, 1 ♂, 1 ♀. In same locality as the previous species.

21. *Gryllomorpha* sp. Ijoukak, vi.1936, 1 ♂.

TETTIGONIIDAE.

22. *Phaneroptera nana* Fieb. Taroudant, vi.1936, 1 ♀. Recorded by Bolivar (1914) from Tangier, this species extends in range from southern Europe to South Africa. I cannot find another record for Morocco; the British Museum has no other specimens from North Africa, and none from Europe.

23. *Odontura maroccana* I. Bol. Amizmiz, vi.1936, 1 ♂, 2 ♀♀. Not previously in British Museum collection.

24. *Odontura* sp. n.? Ras el Ma, vi.1936, 1 ♀. This does not appear to belong to any known species, but as there is only a single female, I prefer to wait until further material has been collected rather than to describe a species from one specimen.

25. *Platycleis grisea grisea* (Fabr.). (= *Metrioptera albopunctata* (Goeze)) Sidi Ali, viii.1934, 2 ♀♀. Timhadit, ix.1935, 1 ♀. Ijoukak, vi.1936, 1 ♀. All these four females, like the one noted by Chopard (1936), belong to the subspecies *grisea* (Fabr.), not to *P. g. occidentalis* Zeuner.

26. *Platycleis affinis* (Fieb.). Ari Ayachi, viii.1934, 1 ♀.

27. *Tettigonia viridissima* L. Ouiouane, viii.1934, 1 ♂, 1 ♀. I cannot find any other record of this species from Morocco, and there are no other specimens from North Africa in the British Museum collection.

28. *Tettigonia lozanoi* (I. Bol.). Sidi Ali, vii.1934, 1 ♂, 1 ♀. Described by I. Bolivar (1914), without, however, the locality of the type being specified. Presumably it was Mellila, as this was where Lozano made his main collection. Chopard (1936) records it from Tadla and Tazarine, and two other specimens, also from the Middle Atlas (Rungs, Ifrane, 1935), are in the British Museum collection.

29. *Eugaster spinulosus* (Joh.). Azrou, vi.1936, 1 nymph.

30. *Eugaster guyoni* Serv. Timhadit, viii.1934, 3 ♂♂, 3 ♀♀. Ras el Ma, vi.1936, 1 nymph. Sidi Ali, vi.1936, 1 nymph. Buxton (1923, *Animal Life in Deserts*) gave this species as an example of a desert-dwelling animal with apparently inexplicable black coloration. In Morocco, however, I have never seen it very far away from water. At Sidi Ali there is, of course, the lake (Aguelman), while at Timhadit I observed it usually not far away from the lush vegetation by the river Guigou. The single specimen from Ras el Ma was found very near to the forester's house, and in a part of the Middle Atlas cedar-forest country where the forest is more than usually mixed with deciduous trees and has a very thick undergrowth. Consequently the air here is much moister than in most parts of Morocco; in such areas as the dry "meseta" between Midelt and Ari Ayachi I never saw *E. guyoni* at all, although it is a conspicuous insect which one is not likely to miss. Unlike many desert TENEBRIONIDAE, the black Eugasters are not provided with an air chamber, which would offset, so to speak, to some extent the disadvantages of their blackness when exposed to strong sun.

31. *Eugaster nigripes* Chop. Ijoukak, vi.1936, 1 nymph. Mouldirt,

vi.1936, 3 nymphs. The remarks about the preceding species probably apply to *E. nigripes* as well. This species was described by Chopard (1936) from two specimens found by Dr. Hemilsdan at Ifegh.

32. *Uromenus chapmani* Uvarov, sp. n. Sidi Ali, viii.1934, 6 ♂♂, 9 ♀♀. Sidi Ali, ix.1935, 2 ♀♀. Sidi Ali, vi.1936, 1 ♀ nymph.

In July and August, 1934, this species was by far the commonest of the larger insects at Sidi Ali. It is rather remarkable, therefore, that no specimens have been found anywhere else in the Middle Atlas during the last three years. In 1934, *U. chapmani* was so common at Sidi Ali that it was impossible to prevent numerous individuals from getting into my kit and travelling to my next camp at Timhadit, about 14 miles away. Many of them dislodged themselves here, but apart from these specimens which had travelled thus from Sidi Ali not a single *U. chapmani* was to be found.

Uromenus chapmani sp. n. (fig. 1).

Description by Dr. B. P. Uvarov.

♂. Under medium size, uniformly coloured (specimens from alcohol); head with blackish pattern behind. Fastigium of vertex thick, moderately compressed, sulcate above, projecting forward. Pronotum with deep folds and thick rugosities in the prozona. Metazona a little shorter than the prozona, shiny, with very low, thick and indistinct rugosities and scattered small punctures; median carina scarcely raised; posterior margin incrassate, very shallowly excised. Lateral lobes inserted under an obtuse angle broadly rounded behind. Elytra with the disc and the marginal cells black. Front femur unarmed; front tibia with two spines on the upper margin, apart from the apical one. Hind femur only about twice as long as pronotum, armed with 5-6 spinules in the apical third of the inner margin. Anal segment transverse, rounded. Supra-anal plate not separated from the anal segment, broadly lanceolate. Cercus stout, longer than the supra-anal plate, with an acute spine beyond the middle of the inner side; the apex acutely conical pointing outwards. Titillator long, straight, with the acute apex bent outwards under an obtuse angle. Subgenital plate large, rounded, with a narrow and shallow apical emargination between the short styli.

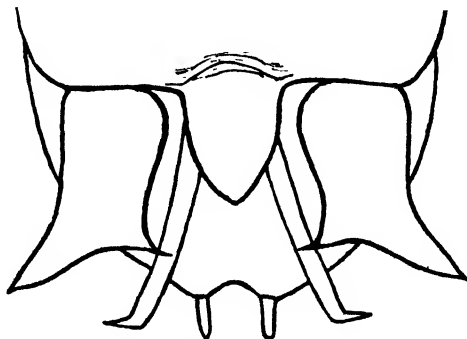


FIG. 1.

♀. Abdominal tergites 3-5 blackened, with a median pale stripe and comma-shaped, sublateral, pale spots. Subgenital plate transverse, with the disc flat and strongly transversely rugose; posterior margin broadly excised; lateral surfaces perpendicular, smooth,

each with a shallow vertical pocket in front of the swollen posterior margin. Ovipositor slightly recurved, somewhat longer than the hind femur.

Total length ♂ 21, ♀ 24; pronotum ♂ 6, ♀ 6.5; front femur ♂ 6, ♀ 7; hind femur ♂ 12.5, ♀ 14; ovipositor ♀ 17.5 mm.

Described from 6 males and 9 females taken at Aguelman Sidi Ali ou Mohammed, 6500 ft., Middle Atlas.

Allied to *U. bueni* I. Bolivar, but differs from it in its much smaller size, relatively shorter legs (hind femur only twice as long as pronotum) and relatively longer ovipositor. The male subgenital plate in *U. bueni* is described as having a deep triangular emargination, which is not the case in the present species. There may be other details in the shape of different parts of genitalia, but they cannot be deduced from the brief description of *U. bueni*. A subspecies of *U. bueni*, called *U. bueni parvus* I. Bolivar, although smaller than the typical form, is larger than *U. chapmani* and has definitely much longer legs (hind femur three times as long as pronotum). Another closely allied species is *U. theryi* Werner, recently described from the Middle Atlas (1934, *Bull. Soc. Sci. nat. Maroc*, 14: 51). It differs from *U. chapmani* by the broader supra-anal plate, less deeply emarginate subgenital plate and by the cerci being longer and armed with a strongly curved spine (B. P. U.).

The stridulation in *U. chapmani* is very loud, and appears to be almost as powerful in the female as in the male. The noise continues throughout the day and night, and continues for a long time after the removal of the head and abdomen of the insect.

At Sidi Ali, vast numbers of apparently starving *Uromenus* invaded our tents and devoured cloth, wool, and other such unpromising material. Outside, they appeared to be feeding on any kind of vegetation, and on other insects, frequently on the Moroccan locust, *Docostaurus maroccanus* (Thunb.), on one another, and on several common species of Tenebrionid beetles of such genera as *Pimelia* and *Blaps*, which were the only terrestrial insects approaching *U. chapmani* in numbers at Sidi Ali. These "desert beetles," in their turn, are often cannibalistic, and prey on the *Uromenus*; individuals of *U. chapmani* were frequently observed devouring one another's legs or pursuing females and eating their ovipositors.

Large numbers of birds of many species were seen preying on Orthoptera at Sidi Ali. I think it very probable that the seasonal abundance of such species as *U. chapmani* must affect the movements of birds like the kestrel very considerably, judging from the unusual sight of crowds of these birds together devouring the Tettigoniids at Sidi Ali. Mr. P. T. Cotton and I examined the stomach contents of birds shot at Sidi Ali in July, 1934, and in the following eight species quite 90 per cent. of stomach content consisted of *Uromenus chapmani*: *Pica pica mauretanica* Malherbe (Moroccan magpie); *Garrulus glandarius* L. (jay); *Pyrrhonorax pyrrhonorax* L. (chough); *P. graculus* L. (Alpine chough); *Corvus monedula* L. (jackdaw); *Coracias garrulus* L. (roller); *Falco tinnunculus* L. (kestrel); *Milvus migrans* Bodd. (black kite).

ORTHOPTERA COLLECTED IN THE ATLAS MOUNTAINS, MOROCCO, 1934-1936. PART 2.

By K. H. CHAPMAN, B.A., F.R.E.S.

TETRIGIDAE.

33. *Paratettix meridionalis* (Ramb.). Taroudant, vi.1936, 1 ♂.

ACRIDIDAE.

34. *Acrida turrita uvarovi* I. Bol. Taroudant, vi.1936, 3 ♂♂, 1 ♀. Uvarov (1927) pointed out that Moroccan specimens of this species differed from European ones in their large size, and slender habitus; many parts of the body, such as the head, antennae, wings, pronotum, etc., being longer than in the typical form. He suggested that this Moroccan form might be a new subspecies, and I. Bolivar (1935, *Eos*, 2 : 408) described this subspecies from Ifni. With his description these specimens from south-west Morocco agree.

35. *Acridella nasuta* (L.). Ijoukak, vi.1936, 7 ♂♂, 3 ♀♀. Mouldirt, vi.1936, 1 ♀. Azrou, vi.1936, 1 ♂. This species was very common in the small native maize fields which are found terracing some parts of the western Great Atlas.

36. *Calephorus compressicornis* (Latr.). Timhadit, ix.1935, 2 ♂♂, 5 ♀♀.

37. *Omocestus lucasi* (Bris.). Sidi Ali, ix.1935, 1 ♂, 1 ♀. Timhadit, ix.1935, 3 ♂♂, 1 ♀.

38. *Omocestus raymondi* (Yers.). Tizi N'Test, vi.1936, 3 ♂♂, 4 ♀♀. Azrou, vi.1936, 2 ♂♂. Sidi Ali, vi.1936, 1 ♀. Marrakesh, vi.1936, 1 ♂.

39. *Omocestus alluaudi* Uv. Ari Ayachi, viii.1934, 1 ♀. This is the only specimen known besides the type male described by Uvarov (1927, *Bull. Soc. Sci. nat. Maroc*, 7 : 202) and is the only female specimen known. The type is from Tachdirt, and the species is thus now shown to occur in both the eastern and western Great Atlas. The following description of the female is by Dr. B. P. Uvarov :

♀. Considerably larger than the male. Frontal ridges flattened but not sulcate below the ocellus. Fastigium of vertex obtusely angulate, wider than long. Elytra extending a little beyond the sixth tergite, not reaching the base of knee lobes. Scapular field wider than the mediastinal.

Total length 18; pronotum 3.5; elytra 9; hind femur 9.5 mm.

The relative length of the female elytra constitutes a further good character for separating *O. alluaudi* from *O. uhagonii* I. Bol., in which the female has strongly abbreviated elytra. (B. P. U.)

40. *Omocestus maroccanus* Chapman. Sidi Ali, ix.1935, 31 ♂♂, 37 ♀♀. This species was described in a previous paper (Chapman, 1937, *Ent. mon. Mag.* 73 : 127-129). It may be noted here, however, that special interest attaches to this species from a zoogeographical point of view, because its relatives are *O. alluaudi* Uv. from the Great Atlas of Morocco (see above), *O. uhagonii* (I. Bol.) from Spain (in which the females are brachypterous) and *O. nanus* Uv. from Asia Minor, in which both sexes are brachypterous as in *O. maroccanus*. Chopard (1936) has recently described two other new species of *Omocestus* from Morocco, *O. le cerfi*, a species from the Middle Atlas, in which the female is brachypterous and the male still unknown, and *O. lépineyi* from near Azib d'Isgoun Ouagouns. Further collecting, particularly in the Great Atlas,

is very desirable to establish the respective ranges of these several species in Morocco, and to obtain more material of *O. alluaudi*. The following comparison of measurements in millimetres with Chopard's recently described species *O. le cerfi* and *O. lépineyi* is given :—

	<i>O. maroccanus.</i>	<i>O. le cerfi.</i>	<i>O. lépineyi.</i>
♀♀ Length of body . . .	13.0	15.0	15.0
Length of posterior femur . . .	8.1	9.5	9.3
Length of tegmina . . .	3.0	5.0	7.5
Length of pronotum . . .	2.5	3.2	—
	<i>O. maroccanus.</i>	<i>O. lépineyi.</i>	
♂♂ Length of body . . .	11.6	10.0	
Length of posterior femur . . .	7.0	7.0	
Length of tegmina . . .	5.3	7.2	

Unfortunately, the two specimens from which *O. le cerfi* was described are females. It will be seen from the above figures, however, that both Chopard's species seem to be larger insects than *O. maroccanus* in most respects, except that the male of *O. lépineyi* is shorter in body. The latter species, however, has the tegmina in both sexes considerably longer than in *O. maroccanus*. The male of *O. maroccanus* is distinguishable from that of *O. lépineyi* by the abdomen not being red at the apex, by the tegmina not reaching the apex of the abdomen, and by the wings not being nearly as long as the tegmina. The latter character also distinguishes the females, as in the *O. lépineyi* females. Wings and tegmina are the same length in *O. lépineyi* in both sexes, whereas in *O. maroccanus* the wings are very much shorter than the tegmina in both sexes.

O. le cerfi, besides differing from *O. maroccanus* (female) in its larger size, longer hind femora, tegmina, and pronotum, may be distinguished by the tibiae, which are reddish towards the apex. The antennae in *O. le cerfi* are blackish and *very much* shorter than the head and pronotum together, which is not the case in the female of *O. maroccanus*.

41. *Stenobothrus palpalis* Uv. Sidi Ali, vii.1934, 1 ♀. Tizi N'Test, vi.1936, 6 ♂♂, 2 ♀♀. Azrou, vi.1936, 1 ♂, 1 ♀. Sidi Ali, vi.1936, 8 ♂♂, 6 ♀♀. Timhadit, vi.1936, 9 ♂♂, 6 ♀♀.

42. *Stenobothrus amoenus* (Bris.). Azrou, vi.1936, 3 ♂♂, 2 ♀♀. Sidi Ali, vi.1936, 4 ♂♂, 1 ♀. Timhadit, vi.1936, 3 ♂♂. A note by Uvarov (1937, *Ann. Mag. nat. Hist.* (10) 19 : 308) on this material and one other specimen collected by Werner at Azrou established the position of this species in the Moroccan fauna.

43. *Chorthippus apicalis* (H.-S.). Timhadit, ix.1935, 1 ♂. Azrou, vi.1936, 4 ♂♂, 2 ♀♀.

44. *Chorthippus biguttulus* (L.). Sidi Ali, viii.1934, 1 ♂. Ari Ayachi, viii.1934, 1 ♀. Sidi Ali, ix.1935, 1 ♂, 1 ♀. Azrou, vi.1936, 1 ♂, 2 ♀♀. Uvarov (1927) recorded this doubtfully, and noted that the Moroccan species was large, and the venation of the male tegmina was not typical in having the second radial vein rather suddenly and strongly bent forward. This applies also to my material. This group is, however, in rather a confused state at present, and the precise relationship of these Moroccan specimens to typical *C. biguttulus* is uncertain.

45. *Chorthippus jucundus* Fisch. Sidi Ali, viii.1934, 1 ♀. Timhadit, xi.1935, 3 ♂♂, 5 ♀♀.

46. *Euchorthippus albolineatus* (Luc.). Ijoukak, vi.1936, 1 ♂. Mouldirt, vi.1936, 7 ♂♂, 13 ♀♀.

47. *Doclostaurus genei* (Ocsk.). Sidi Ali, xi.1935, 13 ♂♂, 21 ♀♀. Timhadit, xi.1935, 5 ♀♀.

48. *Dociostaurus dantini* I. Bol. Sidi Ali, xi.1935, 2 ♂♂. Ijoukak, vi.1936, 7 ♂♂, 14 ♀♀. Mouldirt, 2 ♀♀. Tizi N'Test, vi.1936, 5 ♂♂, 3 ♀♀. This species was described from males only by Bolivar (1914 : 186-187). Uvarov (1927) identified the female from two specimens taken by Alluaud at Haut Imminen, Great Atlas. As the female has not been described, a description is given here :—

♀. Considerably larger than the male. Frontal ridge not so concave, more dilated downwards. Tegmina proportionately shorter than in the male, not reaching to the middle of the hind femora. Supra-anal plate more convex than in the male. Length of body 22.5; pronotum 5.0; tegmina 8.0; hind femur 12.1 mm. The females in the above series vary from a length of 24.5 to 21.0 mm., with a corresponding range in the other characters measured. The males have an average length of 15.0 mm., with pronotum 3.5, tegmina 7.3, and hind femora 10.0 mm. It thus looks as though the type, which has the corresponding figures 12.5, 3.5, 5.5, and 9.0 respectively, is rather a small male.

49. *Dociostaurus maroccanus* (Thunb.), phase *solitaria*. Sidi Ali, viii.1934, 1 ♂, 2 ♀♀. Ouiouane, viii.1934, 1 ♀. Sidi Ali, xi.1935, 4 ♂♂, 2 ♀♀.

50. *Arcyptera maroccana* Wern. Azrou, vi.1936, 1 ♂, 1 ♀. Sidi Ali, vi.1936, 5 ♂♂, 6 ♀♀. 2 nymphs taken at Tizi N'Test in June, 1936, also probably belong to this species.

51. *Paracinema tricolor bisignata* (Charp.). Ouiouane, viii.1934, 1 ♂, 1 ♀. Sidi Ali, xi.1935, 1 ♂, 5 ♀♀. Timhadit, xi.1935, 1 ♂, 1 ♀. Jardin d'Essais, Meknes, xi.1935, 1 ♂. As was to be expected, these all belong to the Mediterranean subspecies defined by Key (1936, *Trans. R. ent. Soc. Lond.* 85 : 379-400). Unfortunately, Key did not know of the collection which I had made in Morocco and which was in the British Museum when he wrote his paper, and he has included only one north African (Algerian) specimen among his *bisignata*, the rest of which are European.

52. *Aiolopus strepens* (Latr.). Marrakesh, vi.1936, 1 ♀. Ijoukak, vi.1936, 1 ♂, 2 ♀♀.

53. *Aiolopus thalassinus* (Fabr.). Ourika, vi.1936, 1 ♀. Ijoukak, vi.1936, 2 ♂♂. Taroudant, vi.1936, 18 ♂♂, 14 ♀♀.

54. *Oedaleus decorus* (Germ.). Sidi Ali, viii.1934, 2 ♀♀. Sidi Ali, ix.1935, 7 ♂♂, 6 ♀♀. Timhadit, ix.1935, 2 ♂♂, 3 ♀♀. Ijoukak, vi.1936, 10 ♂♂, 7 ♀♀. Mouldirt, vi.1936, 1 ♀.

55. *Morphacris fasciata sulcata* (Thunb.). Taroudant, vi.1936, 1 ♂, 2 ♀♀.

56. *Oedipoda coerulescens sulfurescens* Sauss. Sidi Ali, viii.1934, 1 ♂, 2 ♀♀. Sidi Ali, xi.1935, 33 ♂♂, 22 ♀♀. Timhadit, xi.1935, 4 ♂♂, 4 ♀♀.

57. *Oedipoda miniata* (Pall.). Timhadit, xi.1935, 10 ♂♂, 15 ♀♀. Ourika, vi.1936, 1 ♀.

58. *Oedipoda fuscocincta* Luc. Sidi Ali, viii.1934, 2 ♀♀. Sidi Ali, xi.1935, 3 ♂♂, 3 ♀♀. Timhadit, xi.1935, 8 ♂♂, 8 ♀♀. Ijoukak, vi.1936, 6 ♂♂, 13 ♀♀. Mouldirt, vi.1936, 1 ♂.

59. *Thalpomena algeriana* (Luc.). The typical form of this species, described from Algeria by Lucas (1849, *Exp. sci. Algérie* 3 : 34) has bright rose-coloured wings, with a black fascia extending to the anterior border and there extending along the anterior border in a transverse band reaching almost to the base of the wing. This typical form was recorded from Tetuan, on the north coast of Morocco, by I. Bolivar (1914). Uvarov (1927) described two colour aberrations from Morocco : *azureipennis*, having blue wings with an abbreviated fascia (from Marrakesh and western Great Atlas); and *viridipennis*, which has pale greenish wings with a strongly developed fascia (from Azrou, Middle Atlas Mountains,

and Fez). My records for 1936 are: *azureipennis*—1 ♂ from Tizi N'Test, vi.1936; *viridipennis*—Azrou, vi.1936, 2 ♂♂, 1 ♀; Sidi Ali, vi.1936, 1 ♂, 1 ♀.

***Thalpomena algeriana* ab. *flavipennis* ab.n.**

Wings pale yellow; fascia strongly developed, apex of wing infumate. Pronotum rugose.

IFRANE (5000–5500 ft.), Middle Atlas Mountains, ix.1935, Coll. Rungs, 1 ♀.

Thus it is seen that *viridipennis* and *flavipennis* occur in central Morocco and the Middle Atlas, while *azureipennis* occurs in the western Great Atlas. Another form, *coeruleipennis*, with blue wings with a very wide fascia, occurs at Tlemcen, north Algeria, and another species, *T. coerulescens* Uv. at Ain Sefra, in the eastern extension of the Great Atlas into Algeria. No collecting has been done in the eastern Great Atlas, but it is possible that blue-winged forms connecting *coeruleipennis* with *T. coerulescens*, and which may eventually prove to be another form of *T. algeriana*, might occur there.

Some specimens with pink wings were taken in the western Great Atlas. They have, however, the fore part of the wing blue. Their connection with *coeruleipennis*, if any, has yet to be shown, and indeed the whole explanation of the occurrence of these colour forms and their distribution in Morocco remains a mystery. While material is so scanty, it would be of little use to attempt an explanation, but, as suggested above, mountain isolation may have something to do with the actual preservation of variations such as these.

Since the above was written, another specimen from Djelfa, Algeria, collected by Karsakoff (v.1937) has come to notice. This appears to be nearest to *coeruleipennis* (having blue wings).

60. *Sphingonotus savignyi* Sauss. Marrakesh, vi.1936, 2 ♂♂, 1 ♀. Not recorded for Morocco by Uvarov, Bolivar or Chopard, and no Moroccan specimens are in the British Museum collection.

61. *Sphingonotus finotianus* (Sauss.). Sidi Ali, xi.1935, 1 ♀. Marrakesh, vi.1936, 2 ♂♂, 2 ♀♀. Ijoukak, vi.1936, 1 ♀.

62. *Sphingonotus rubescens rubescens* (Walk.). Marrakesh, vi.1936, 2 ♂♂.

63. *Sphingonotus lucasii* Sauss. Taroudant, vi.1936, 9 ♂♂, 3 ♀♀. New to Morocco, but previously recorded from Algeria, Tunis, and Egypt.

64. *Sphingonotus maroccanus* Uv. Ari Ayachi, viii.1934, 1 ♂, 2 ♀♀. I have not seen this species in the Middle or western Great Atlas, but Mr. J. L. Chaworth-Musters took one specimen at Taddert, in the western Great Atlas, in February, 1937. The type was taken at Arround by Cockerell (western Great Atlas) in August, and Rungs has also collected *S. maroccanus* at Taddert, in August. It is therefore rather difficult to understand why it was not taken in June, 1936, in several western Great Atlas localities when a good deal of attention was being paid to *Sphingonotus*.

65. *Sphingonotus azurescens azurescens* Rmb. Ari Ayachi, viii.1934, 1 ♀. Marrakesh, vi.1936, 4 ♂♂, 5 ♀♀. Ijoukak, vi.1936, 10 ♂♂, 22 ♀♀.

66. *Sphingonotus coerulans atlas* subsp.n.

Near to the typical race *S. coerulans coerulans* (L.), differing as follows:

♀. Head scarcely projecting above the pronotum, densely and coarsely punctured. Lower posterior angle of lateral lobes of pronotum rounded. Tegmina slightly longer than the posterior tibiae. Hind femora on inside with two light fasciae. General coloration sandy brown. Wings paler blue than in the typical race.

♂. As the female, but smaller. Similar to the typical race.

Geographical distribution.—Morocco : Middle and Great Atlas Mountains. Specimens examined.—6 ♂♂, 13 ♀♀.

Ari Ayachi, E. Gt. Atlas, viii.1934, 1 ♀. Sidi Ali ou Mohammed, Middle Atlas, ix.1935, 1 ♀. Ijoukak, W. Gt. Atlas, vi.1936, 4 ♂♂, 11 ♀♀. Mouldirt, W. Gt. Atlas, vi.1936, 2 ♂♂. Type ♀ (from Ijoukak) and 18 paratypes in the British Museum (Natural History).

The above description has been worded as far as possible on the model of Mistshenko's descriptions (1936, *Eos*, 12 : 65-282) of subspecies of *S. coeruleans*, for the sake of uniformity and facility of comparison.

This is the first record of *S. coeruleans* (L.) from the African continent. The other subspecies are: *S. c. coeruleans* (L.) Europe and S.W. Asia. *S. c. exornatus* Nedelkov, Italy, Greece, and S.W. European U.S.S.R. *S. c. corsicus* Chopard, Corsica, Sardinia, Balearic Islands, Spain, and Portugal. *S. c. cyanopterus* (Charp.), Europe from Scandinavia to France and Russia. *S. c. caspicus* Mistshenko, Transcaucasus and N.W. Iran. *S. c. insularis* Uvarov, Cyprus.

This new Moroccan subspecies appears to be most like *corsicus*, as might be expected, and *insularis*. It may be distinguished from *corsicus* by its larger size and by the more attenuated lower posterior angles of the lateral pronotal lobes; and from *insularis* by the darker inner surface of the hind femur, and the hind tibiae, which are dark instead of pale blue. It might be considered rather remarkable that such a large and conspicuous insect should have escaped collection in north Africa up to the present. The genus *Sphingonotus*, however, was in rather a confused state until the recent work of Mistshenko (*loc. cit.*), and although I collected an odd specimen in 1934 and 1935, identification was not attempted until Mistshenko's paper was available. It will be seen that the new subspecies is distributed in both the east and west Great Atlas, and in the Middle Atlas. It is therefore not unlikely that more records of its occurrence in other parts of Morocco, and possibly also in other countries of north Africa, may be established.

67. *Acrotylus insubricus* (Scop.). Ari Ayachi, viii.1934, 1 ♂. Timhadit, ix.1935, 2 ♂♂, 16 ♀♀. Marrakesh, vi.1936, 3 ♂♂, 4 ♀♀. Mouldirt, vi.1936, 2 ♀♀. Ijoukak, vi.1936, 2 ♂♂, 3 ♀♀. Taroudant, vi.1936, 11 ♂♂, 8 ♀♀. Sidi Ali, vi.1936, 3 ♀♀. Azrou, vi.1936, 2 ♂♂, 3 ♀♀. Timhadit, vi.1936, 2 ♂♂. Ras el Ma, vi.1936, 1 ♀.

Three subspecies of this grasshopper were found in Morocco. The typical form was taken at Marrakesh, and other specimens between the typical form and *A. i. inficita* Wlk. were taken at Ijoukak, Mouldirt, and Sidi Ali. In the Middle Atlas *A. i. fischeri* (Az.) was the commonest form, and was also taken in the eastern Great Atlas at Ari Ayachi. Evidently the subspecies occurring in a locality does not depend solely on altitude, as those from the Middle Atlas are typical *fischeri*, while others from higher up in the western Great Atlas are almost typical *insubricus*. It is suggested that humidity may be a factor influencing the subspecies of *insubricus*, as the Middle Atlas localities where *fischeri* occurred are much more sheltered and damper than the higher Great Atlas localities where typical *insubricus* was taken.

68. *Acinipe* sp. Azrou, ix.1935, 1 ♀. Ijoukak, vi.1936, 8 ♂♂, 9 ♀♀. Tizi N'Test, vi.1936, 13 ♂♂, 4 ♀♀.

69. *Euryparyphes* sp. Sidi Ali, viii.1934, 1 ♂. Timhadit, viii.1934, 1 ♀. Tizi N'Test, vi.1936, 3 ♀♀. Azrou, vi.1936, 8 ♂♂, 11 ♀♀. Amizmiz, vi.1936, 4 ♂♂, 6 ♀♀. Ras el Ma, vi.1936, 5 ♂♂, 3 ♀♀. Sidi Ali, vi.1936, 1 ♂, 3 ♀♀. Ourika, vi.1936, 1 ♂.

70. *Amigus* sp. ? *nigroadspersus* I. Bol. Ourika, vi.1936, 1 ♀. The confused state of the above three genera and the obscurity of some specific descriptions make it inadvisable to attempt to identify the species at the present time.

71. *Pyrgomorpha agarena* I. Bol. Marrakesh, vi.1936, 2 ♀♀. Azrou, vi.1936, 3 ♂♂, 2 ♀♀. Sidi Ali, vi.1936, 2 ♂♂, 5 ♀♀. Ijoukak, vi.1936, 1 ♂, 1 ♀.

72. *Pyrgomorpha* sp. Ijoukak, vi.1936, 1 ♂, 8 ♀♀. Mouldirt, vi.1936, 1 ♀. Marrakesh, vi.1936, 1 ♀.

73. *Pezotettix giornae* (Rossi) var. *rufipes* Br. Sidi Ali, ix.1935, 3 ♂♂, 3 ♀♀. Timhadit, ix.1935, 1 ♂, 1 ♀.

This variety was previously unrepresented in the British Museum collection. I cannot find any previous record of its occurrence in Morocco. Chopard (1936) recorded *P. giornae*, but whether it is the typical race or *rufipes*, he does not state. It is possible that only the variety with red tibiae is found in north Africa, and, if so, that it may be considered a subspecies.

74. *Amizmizia puppa* I. Bol. Mouldirt, vi.1936, 1 ♂. There are only two other specimens in the British Museum, and both are females.

75. *Calliptamus italicus* (L.). Sidi Ali, ix.1935, 2 ♀♀. Timhadit, ix.1935, 3 ♂♂, 7 ♀♀. Ijoukak, vi.1936, 2 ♂♂, 13 ♀♀. Mouldirt, vi.1936, 5 ♂♂, 7 ♀♀.

76. *Calliptamus montanus* Chop. Sidi Ali, ix.1935, 4 ♂♂, 17 ♀♀. This was labelled "*C. wattenwylianus* Pant. n. sbsp.," by Dr. Ramme, but Dr. Chopard has since identified it as belonging to his recently (1936) described *C. montanus* from Morocco.

77. *Calliptamus wattenwylianus* Pant. Sidi Ali, viii.1934, 1 ♂, 1 ♀.

78. *Calliptamus* sp. Timhadit, viii.1934, 1 ♂, 1 ♀.

79. *Acanthacris ruficornis citrina* (Serv.). Ijoukak, vi.1936, 1 ♂. Taroudant, vi.1936, 1 ♀.

ON THE BRITISH LESTREMIINAE, WITH NOTES ON EXOTIC SPECIES.—3. (DIPTERA, CECIDOMYIIDAE)

By F. W. EDWARDS, F.R.E.S.

Catotrichini.

IN the first paper of this series I remarked that *Catocha americana* Felt did not belong to the genus *Catocha* and probably not to the Catochini; this remark was based on Felt's description and figure. I have now received from Mr. C. T. Greene some additional information regarding the type of *C. americana* and have also received on loan from Prof. C. P. Alexander the types of two allied species, *Catocha nipponensis* Alex. and *C. subobsoleta* Alex., and as a result of the fresh information available I have no hesitation in proposing a new genus and a new tribe for these species. As tribal characters the following may be mentioned :

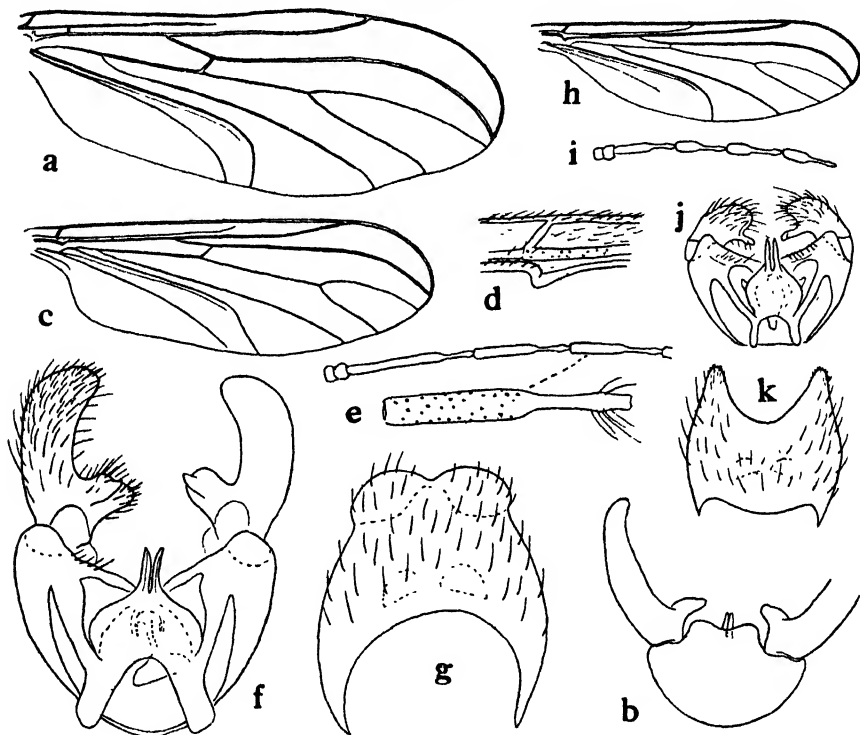
Ocelli three. *Antennae with the longer hairs on flagellar segments irregularly arranged, not forming distinct whorls.* Wings with *Rs* rather long; *R5* far removed from costa and almost or quite reaching wing-tip; costa produced; *M* with long fork; *Cu1* arising from stem of *M*; *CuP* free; *An* long; humeral cross-vein present; *Sc* almost or quite reaching costa; *Sc2* present.

Catotricha gen. n.

Genotype, *Catocha americana* Felt.

Eyes bare, as usual in CECIDOMYIIDAE, reniform, the dorsal portions very broad, separated in middle. Ocelli three, equal. *Antennae* (♂) with 2 + 14 segments, flagellar PROC. R. ENT. SOC. LOND. (B) 7. PT. 5. (MAY 1938.)

segments with long necks, the enlarged basal portion bearing long and short hairs, the long hairs numerous but quite irregularly arranged and not all of same length; a slight enlargement of neck just before tip bears several hairs, especially beneath (this is a unique feature in the subfamily); no sensoria. Palpi short, 4-segmented. Thorax with moderately large scutellum and small postnotum; anepisternal area more extensively sclerotised than in most LESTREMIINAE, anepisternal suture complete (in both species examined by me, not incomplete in *C. nipponensis* (Alex.) as suggested by Crampton). No acrostichal hairs;



4

FIG. 4.—*Catotricha* spp. a, b, *americana*, wing and hypopygium (sketches from type by C. T. Greene). c–g, *nipponensis*: c, wing (hairs omitted); d, base of wing showing pores on Sc; e, base of antenna with one segment enlarged; f, hypopygium from above; tergite (g) removed. h–k, *subobsoleta*, wing, base of antenna, hypopygium from above with tergite (k) removed. (c and h to same scale; also f, g, j and k.)

dorsocentrals few and very short; no hairs on pleurae. Legs with pubescence of two lengths, the shorter not at all scale-like. Empodium much shorter than claws. Wings with membrane and veins clothed fairly densely with fine macrotrichia, which are mostly erect or even slightly reflexed; microtrichia dense and rather longer than usual. Humeral cross-vein strong. Sc long and almost or quite reaching costa; in *C. nipponensis* (Alex.) at least it bears a group of about 20 pores at the base (fig. 4, d); in this species also (the only one of which I have examined a mounted wing) small pores occur at rather irregular intervals along veins R1 and R5, at least six on the latter vein. Costa produced well beyond tip of R5, but there is no interruption of the marginal thickening at tip of costa; hind border of wing more strongly thickened than usual in LESTREMIINAE. Hypopygium with

the tergite large, bilobed at tip (lobes turned downwards in *C. nipponensis* (Alex.)); anal segment small and hidden; coxites broadly united beneath; style with basal thumb-like projection and no terminal tooth; tegmen of characteristic form, ending in a pair of long points.

The venation of this genus is remarkably like that of the Mycetophilid genus *Heterotricha*, and before seeing specimens of *Catotricha* I was inclined to suspect a relationship with that genus. However, this relationship if it exists cannot be at all close as the antennal and hypopygial structure of the two is entirely different, and *Catotricha* agrees with other CECIDOMYIIDAE in lacking tibial spurs, whereas spurs are present in *Heterotricha* as in almost all other MYCETO-PHILIDAE.

The distinctions in venation, antenna and hypopygium between the two North American species (*C. americana* (Felt) and *C. subobsoleta* (Alex.)) and the Japanese *C. nipponensis* (Alex.) are illustrated in fig. 4. *C. subobsoleta*, with its abbreviated anal vein and relatively small hypopygium with short style, evidently stands somewhat apart from the other two species, but nevertheless seems to be congeneric with them. Each of the three is known from a single male.

Catochini.

The species of this tribe are even fewer than in the case of the Lestremiini; they are rare in collections and scarcely anything is known of their life-history, one species of *Catocha* having been reared from moss. The only species of which I have seen a fair amount of material is *C. latipes* Hal., and my definition of the tribe (p. 24) was based upon that species. When some of the others are better known the definition may need modification.

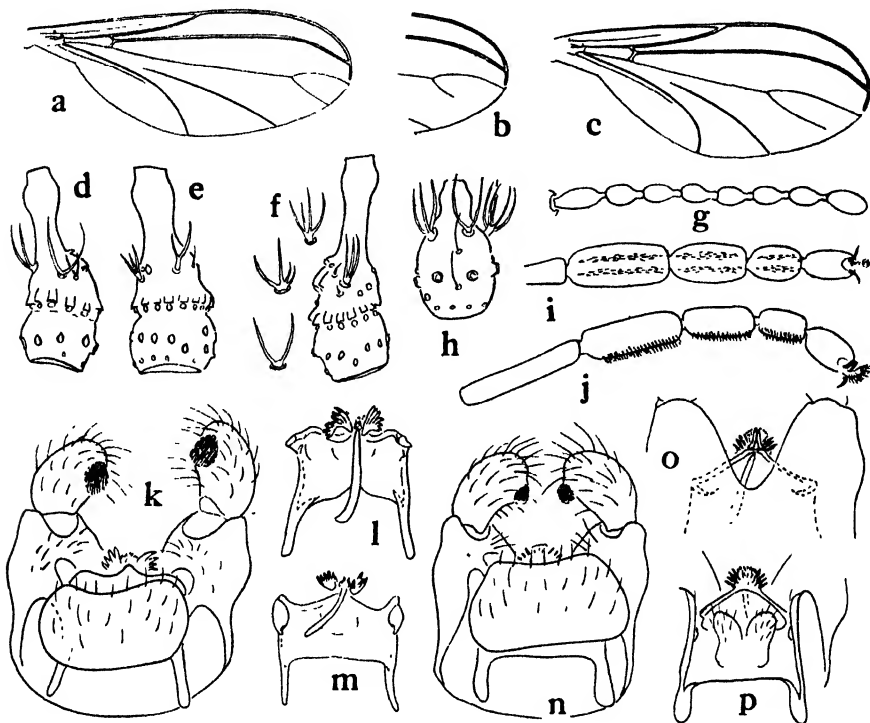
In the few wings of *Catocha* examined I have not made out the pores very clearly; there are apparently one or two near the tip of *R*₁, but certainly none at the tip of *R*₅.

Catocha Hal.

The following diagnosis has been drawn up from a study of the genotype, *C. latipes* Hal.

Eye-bridges moderately broad. Antennae of ♂ long, 16-segmented, flagellar segments with long necks, the basal part with two hair-whorls, one near base, the other (of longer hairs) near middle, a slight "waist" between them; distally to the longer hair-whorls are some short sensory bristles, which may be simple or branched. Antennae of ♀ 10-segmented, sensoria with more branches than in ♂, resembling those of the subgenus *Anaretella*, but four in number instead of only two; last segment without sensoria. Palpi 4-segmented but rather short; last two segments occasionally fused. Mesonotum with few lateral and dorso-central hairs only. Hypopygium with tergite rather large; anal segment small and hidden; style short, with a black projection near tip which under high magnification appears like a brush of densely-packed spinules; tegmen with two groups of spines attached to its margin; genital rod well marked. Female with two moderate-sized spermathecae. Legs long; front tarsi in ♀ with segments 2-4 thickened and provided with a "sole" (i.e. flattened beneath and with dense short bristly hair, this hair arranged in two parallel stripes running the whole length of the three segments). Wings with fairly dense short macrotrichia over the whole membrane. *R*₁ long; *R*_s and *rm* both short and about equally oblique; costa produced much beyond tip of *R*₅; media with a short fork (which is, however, variable in length, lower branch sometimes incomplete); *Cul* arising well beyond base of wing and quite free, not originating from base of *M* as sometimes depicted.

Several of the species described as belonging to this genus are probably incorrectly placed, but the North American *C. slossonae* Felt appears from the descriptions and figures to be a true *Catocha*.



5

FIG. 5—*Catocha latipes* Hal. and vars. a, Typical wing (hairs omitted); b and c, variations in median fork (Bonhill and Austwick). d-f, Segment of ♂ antenna; d, Irish ♂ (Barnes coll., Cecid. 528); e, var. from Austwick; f, type ♂ of *kiefferi*, showing variation in sensoria on different segments. g, Outline of ♀ antenna; h, one segment enlarged. i, j, Front tarsus of ♀, ventral and side views. k, Hypopygium from above and l, aedeagus from beneath, of typical ♂. m, Aedeagus from beneath, type of *kiefferi*. n-p, ♂ from Austwick; n, hypopygium from above; o, outline of coxites and aedeagus from beneath; p, basal parts from above with ninth tergite removed.

C. latipes Hal.

C. crassitarsis v. d. Wulp.? *C. muscicola* Kieff.? *C. kiefferi* Strobl.

A small species with shining blackish thorax, dark antennae and abdomen, and legs varying in colour from yellowish to dark brown. Wing-length 2-3 mm. Antennae of ♂ with flagellar segments typically as in fig. 5, d; antennae of ♀ as in fig. 5, g, h; sensoria variable in branching on different segments and even the sensoria of one segment may be different; commonly a sensorium is trifid from the base, but the number of branches varies from 2 to 5 and the branching may not always be from the base. Front tarsus of ♀ as shown in fig. 5, i, j (according to Haliday's original description the third, fourth and fifth segments of the

female tarsi are dilated; this was doubtless a slip of the pen from "second, third and fourth," and Haliday should have added that only the front tarsi are so affected). Hypopygium of ♂ as in fig. 5, k, l (♂♂ from Oxford and Tyrone were found to be closely similar).

I have seen four British specimens: 1 ♂ from Oxford (*Hamm*), 1 ♂ from Bemburb, Tyrone (*H. F. Barnes* coll., *Cecid.* 528); 1 ♀ from Bonhill, Dumbarton (*Malloch*), and 1 ♀ from Ippolyts, Herts (*F. W. E.*). There is also a broken ♂ in Winnertz's collection in Bonn named by Haliday.

Of continental specimens I have seen a series of ♀♀ from the Oldenburg collection (Berlin-Dahlem) and the 2 ♂♂ paratypes of *C. kiefferi* Strobl, one of which is here figured (fig. 5, f, m). The supposed distinction in ♂ antennae between *C. latipes* and *C. kiefferi* (indicated by Kieffer and Strobl) was presumably due to the specimens of *C. kiefferi* having been examined in the dry state; in the mounted antenna no difference is apparent. Mr. Kruseman informs me that the type ♀ of *C. crassitarsis* v. d. Wulp still exists in the Amsterdam Museum; it seems to be similar to *C. latipes*.

C. latipes Hal., var. ?

A male collected at Austwick, Yorks, v.1933 (*F. W. E.*) may be an individual variation of *C. latipes*, or just possibly a distinct species. It has the median fork of the wing longer than in the other specimens examined, with the lower branch incomplete (fig. 5, c), more numerous hairs in the median whorl of the antennal segments (fig. 5, e) and in the hypopygium a rather smaller black patch on the style (fig. 5, n) and a slight difference in the aedeagus (fig. 5, o, p).

Neocatocha Felt.

Dr. E. P. Felt has kindly supplied me with a sketch of the wing of the genotype, *N. marilandica* Felt (fig. 6, b) and informs me that the wing-membrane is rather uniformly clothed with macrotrichia. The wing shows no important divergence from *Catocha*, the sharply bent vein *Cu* being probably only a specific or individual feature. In 1928 I placed *Neocatocha* as a synonym of *Catocha*, and this may be correct, though the ♀ antenna of *N. marilandica* as described and figured by Felt is very different from that of *C. latipes*. The ♂ of *N. marilandica* is unknown.

Eucatocha gen. n.

Genotype, *Catocha barberi* Felt (North America).

Mr. C. T. Greene has kindly supplied me with information regarding Felt's type of *C. barberi*. Both specimens are males, not females as stated in the original description, and exhibit characters which must definitely exclude them from the genus *Catocha*. The following diagnosis of the new genus which I propose for this species has been prepared from the somewhat damaged paratype, and is necessarily incomplete.

Eyes in contact above. Ocelli (not clearly shown in the mount, the head of which is squashed) apparently two in number, small, and in contact with eyes. Antennae (♂) 2 + 14; necks very long and bare, basal enlargement with a double median whorl (fig. 6, e). Palpi 4-segmented, rather short. Front femora with an antero-ventral row of bristly hairs. Empodium very short. Claws long, nearly straight, with small serrations beneath towards base. Wings without macrotrichia on the membrane or on branches of *M* and *Cu*; on *R1* and *R5* single rows of macrotrichia are present. About 4 pores on *R1* and 6 on *R5*, at rather irregular intervals. Venation (fig. 6, c): Humeral cross-veins apparently

absent as in other Catochini; *Sc* abbreviated at tip as usual; *R1* long; *Rs* short and transverse, much shorter than *rm*; *R5* somewhat sinuous, reaching wing-tip; costa produced; posterior wing-margin not much thickened; median fork rather long; *Cu1* free, arising below *Rs*; *CuP* free; *An* absent. Hypopygium (damaged in the specimen examined, fig. 6, d): coxites and tegmen somewhat as in *Strobliella*, tegmen without teeth at tip;

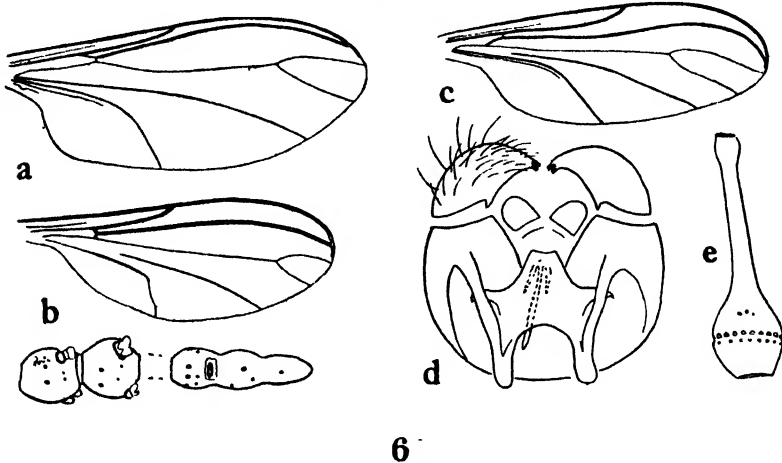


FIG. 6.—a, *Catarete brevinervis*, wing of type (sketch by Dr. Kemner). b, *Neocatocha marilandica*, wing and antennal segments of type (sketches by Dr. E. P. Felt). c-e, *Eucatocha barberi*, paratype ♂; wing, hypopygium with tergite removed (somewhat reconstructed from the damaged specimen); one segment of antennal flagellum.

anal segment prominent, not hidden; style with a number of fine teeth at tip; genital rod distinct.

Catarete Edw.

This generic name was proposed by me in 1928 for *Lestremia brevinervis* Zett., the type of which I saw in Lund in 1923. The chief characters indicated as differentiating it from *Catocha* were the bare wings (without macrotrichia on membrane), *R5* running near costa, and the short, 8-segmented antenna with the last segment bristly at the tip. Dr. Kemner has now kindly supplied a sketch of the venation of the type (fig. 6, a), from which it will be seen that a further feature distinguishing the wing of this species from other LESTREMIINAE is that *Cu1* runs to the base of the wing (as in SCATOPSIDAE). Dr. Kemner also reports that so far as he can see there are only two ocelli. The genus thus seems to be intermediate between *Anarete* and *Catocha*. The sex of Zetterstedt's type is uncertain as the tip of the abdomen is missing.

C. brevinervis cannot yet definitely be placed on the British list, no specimen having been found since Haliday's doubtful record of one from Cork.

Strobliellini.

This tribe includes the single genus *Strobliella*, founded by Kieffer upon a male taken by Strobl in Austria which has hitherto remained the only recorded specimen. I have examined Kieffer's type, and also two females, taken in Britain, which appear to belong to the same species, and am therefore in a position to correct and complete Kieffer's description of the genus.

The relationships of *Strobliella* are evidently closest to the Campylomyzini, although the venation (especially in regard to veins *R1*, *R5*, *Cu1* and *Cu2*) is

not unlike that of *Catocha*. A peculiarity not found in the *Campylomyzini* nor in *Catocha* is the absence of any break in the thickening of the wing-margin at the end of the costa. I have not been able to detect pores in the veins of the specimens examined.

Stroblrella Kieff.

Ocelli three, equal in size. Eye-bridges four facets wide. Antennae alike in the two sexes, with more than 20 segments (broken in type ♂); second segment slightly transverse, not enlarged; most flagellar segments (fig. 7, c) rounded, with a rather stout neck about equal in length to the basal portion; swollen part with an irregular basal whorl of short hairs, a sparse median whorl of long spreading dark hairs, and before the neck with numerous short pale curved hairs none of which is specially modified. Palpi 4-segmented, not very

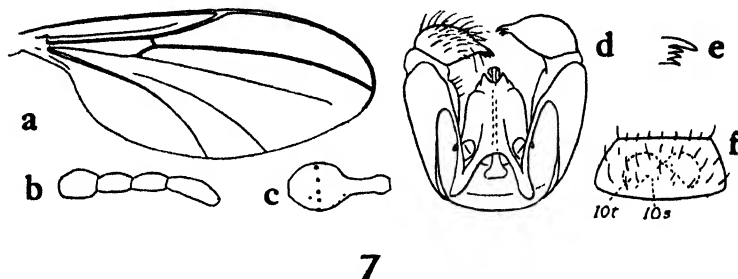


FIG. 7.—*Stroblrella intermedia*, type ♂. a, Wing (hairs omitted). b, Palp. c, Segment of antennal flagellum. d, Hypopygium from above, with (e) tip of style in end view and (f) tergite with underlying anal segment removed and shown separately.

long. Mesonotum with rows of dorso-central hairs, area between these bare. Legs long; hairs on tarsi of two lengths, the shorter pubescence not scale-like. Claws simple. Empodium very short. Wings with rather dense macrotrichia spread over the whole membrane; margin continuously thickened, but distinctly less so from tip of *M* (not uniformly thick as stated by Kieffer). Venation (fig. 7, a): *M* not reaching margin; *Cu1* free, arising near *r-m* (not at base of wing as stated by Kieffer); *R1* long; costa reaching well beyond *R5*; *Rs* nearly or quite transverse and shorter than *r-m* (Kieffer described the two as of equal length and obliquity). Hypopygium (fig. 7, d-f): Tergite large; anal segment small and hidden; coxites largely confluent; style short, toothed at tip; tegmen and genital rod of normal form. Spermathecae: two in number, moderately large and spherical.

S. intermedia Kieff.

♂ (Type). Wing and hypopygium as figured. Wing-length 3.5 mm.

♀. Head blackish, with slight greyish bloom when seen from above and with black pubescence. Antennae nearly as long as whole body, with 2 + 23 segments (in both specimens examined). Proportions of palpal segments about as 1:1:2:3.5. Thorax dark brown, with slight dusting, scutellum and area in front of it yellowish, also shoulders and middle of pleurae. Dorso-central hairs dark, irregularly biserial. Abdomen rather long and slender, distal segments not much reduced in size, cerci very short and broad. Legs long, light brownish; front tarsi simple, no segment at all thickened. Wings appearing blackish owing to dense macrotrichia; venation as in ♂, but in both specimens *Rs* is definitely transverse and barely half as long as *rm*. Halteres light brownish. Wing-length 4.4-5 mm.

MORAYSHIRE: Logie, 20.ix.05, 1 ♀ (*F. Jenkinson*). CHESHIRE: Goyt Valley, 9.x.1932, 1 ♀ (*H. Britten*).

HISPINEN AUS DEM BRITISCHEN MUSEUM. I. TEIL.

71. Beitrag zur Kenntnis der Hispinen (Coleoptera Chrysomelidae).

VON ERICH UHMANN, Stollberg-Erzgeb.

Communicated by G. J. ARROW, F.R.E.S.

MIR hat ein umfangreiches Material dieses Museums vorgelegen. Ich habe in Folgendem nur die Arten angeführt von denen in faunistischer, systematischer oder körperlicher Beziehung Wesentliches zu sagen war. Von allen Neuheiten sind mir Paratypen nebst viel Material in zuvorkommender Weise überlassen worden.

Neue Gattung: *Sternochispa*.

- Neue Arten: 1. *Sceloenopla* (*Ocnosispa*) *arrowi* (fig. 1) Columbia
 2. *Sternostena costaricana* Costa-Rica
 3. *Clinocarisma plaumanni* Brasilien
 4. *Clinocarisma subhomalina* Brasilien
 5. *Sternochispa gracillima* Brasilien
 6. *Ochthispa lineola* Amazonas
 7. *Botryonopa dutilana* Borneo
 8. *Agonia dutilana* Borneo

Verzeichnis meiner auf den folgenden Seiten citierten Beiträge:

20. 1930, *Fol. zool. hydrobiol.* 1.
 28. 1931, *Rev. Zool. Bot. afr.* 20.
 30. 1931, *Boll. Soc. ent. Ital.* 63.
 51. 1935, *Rev. Ent. S. Paulo* 5.
 54. 1935, *Arb. morph. tax. Ent.* 2.
 56. 1935, *Fol. zool. hydrobiol.* 8.
 61. 1936, *Festschrift Strand, Riga*, 1.

1. *Prosopodonta latipennis* Pic.

1, Rio de Janeiro (coll. A. Fry), 1, BRASILIEN (*Cephalolia melanocephala* Dej.) (coll. Laferté). Letzteres Stück mit gelbbrauner Basalhälfte des Halsschildes.

2. *Sceloenopla* (*Ocnosispa*) *arrowi* sp. n.

Obconica, subopaca, elytris nitidulis, sanguinea, prothorace vittis duabus nigris, signatura nigra vel aeneo-micanti elytrorum ut in *S. coccinea* Guér. (vide Baly, 1858, *Catalogue of Hispidae*, pl. 9 fig. 2) sed apice nigro in angulo suturali macula communi sanguinea interrupta et macula postmediana in utroque elytro in maculam communem formata differens. Prothorace leviter transverso, angulis anticis prominentibus, sparse punctato; elytris striis decem regularibus, costis quattuor, humeris mediocribus, angulo postico dente parvo, margine postico non denticulato. 6.5 mm.

Der *S. (Ocnosispa) coccinea* Guér. ähnlich, besonders in der Deckenzeichnung (Fig. 1). Kopf und Halsschild matt, Decken glänzender. Rot oder rötlich-gelbbraun, mit 2 schwarzen Längsbinden auf dem Halsschild, Decken mit schwarzer, grünlich- oder bläulich-metallglänzender Zeichnung, rotgelb bleiben: 1 Fleck ums Schildchen; 1 auf der vorspringenden Basalpartie; 1 schräge Querbinde, die unterhalb der Schulter auf dem Seitenrand entspringt und sich bis zur 1. Punktreihe hinzieht; 1 Randfleck hinter der Mitte

bis oder über die 3. Rippe nach innen reichend; beiderseits 1 Nahtfleck von der Naht bis zur 3. Punktreihe, beide Flecke zu einem gemeinsamen Fleck vereinigt; 1 Querbinde, die innerhalb der Hinterwinkel entspringt und an der Naht unterbrochen ist; 1 kleiner, gemeinsamer Spitzenfleck.—Kopf unpunktiert, mit feiner Mittellinie, zwischen den Fühlern

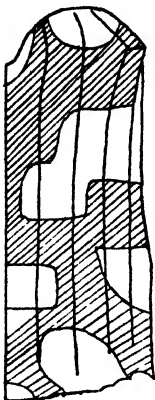


FIG. 1.—*Ocnosispa arrowi* sp. n., rechte Decke.

fein gekielt. Kopfschild mit kleiner, vorspringender, glänzender Keule. Augen gewölbt.—Fühler den Hinterrand des Halsschildes überragend, Glied 1 rundlich, 2–7 länger als breit, wenig voneinander verschieden, 8–10 einander gleich, zylindrisch, etwas dicker als die vorhergehenden, $8 = 6 + 7$, Endglied am Ende zugespitzt.—Halsschild um die Hälfte länger als breit, mit vorragenden, spitzen Vorderwinkeln, nach vorn schwach konvergenten Seiten, die in der Mitte schwach gewinkelt sind. Scheibe mit zerstreuten Punkten.—Schildchen länglich viereckig, glatt, glänzend.—Decken zur Spitze schwach erweitert mit kleinem, flachem, aber scharfem, dreieckigem Zahn an den Hinterwinkeln. Seitenrand nach hinten zu etwas verflacht, ganzrandig, Hinterrand erloschen gezähnt. 10 regelmässige Punktreihen, 4 vollständige Rippen, die beiden äusseren schwächer. Vordersehnen beim ♂ an der Spitze verdickt, mit Zahn.

2, COLUMBIA: Magdalena Valley. El Banco (C. Allen).

3. *Sternostena varians* Ws.

1, AMAZONIEN.

4. *Sternostena costaricana* sp. n.

Flavo-testacea, antennis, capite macula frontali excepta, vittis tribus prothoracis, scuto, macula scutellari, lineola subhumerali, tertio apicali, pedibus basi femorum excepta nigris.—Antennis gracilibus, ad apicem incrassatis, interstitio sexto postice subelevato.—5 mm.

Was ich in 20 : 246 und 28 : 361 zu *S. varians* ab. *apicalis* Ws. gestellt habe, gehört nicht dahin. Ich habe den Typus von *S. v.* ab. *apicalis* gesehen und bin nun überzeugt, dass hier nicht etwa nur eine neue Aberration zu *S. varians*, sondern eine gute Art vorliegt. Unterschiede gegen *S. varians* ab. *apicalis*: die basalen Fühlerglieder schlanker, 3 mindestens so lang wie 2, 4 und 5 deutlich länger als breit. Die ungeraden Zwischenräume sind bei *S. apicalis* unterdrückt, bei *S. costaricana* ist der 6. hinten deutlich und etwas erhoben. Körperumriss nicht so schlank, nicht so parallel. Auf den Decken sind schwarz gefärbt: das Enddrittel, sein Vorderrand konvex, eine Schildchenfleck und bei einem Stück die Naht mit der ersten Punktreihe bis zum Spitzenfleck, ein Randfleck unter der Schulter. Bei

S. apicalis ist der Spitzenrand regelmässig gezähnt, die grösseren Zähne fast so lang wie breit, bei *S. costaricana* ist die Zähnung schwächer und unregelmässig.

1 ♂, COSTA-RICA : Hamburgfarm, 12.iii.1925 (*F. Nevermann*), Holotypus. 1, COLUMBIA (Pehlke), Paratypus. In meiner Sammlung.

Sternostena varians ab. *triangularis* Uh. (30 : 58) ist doch gute Art wegen des Zahnes der Mittelschenkel.

5. *Anoplitis marginella* Ws. ab.

3, BRITISCH WEST-INDIEN : Trinidad (*G. E. Bryant*), vergleiche 56 : 232.

6. *Clinocarispa plaumanni* sp. n.

Differt a *Clinocarispa fasciata* ab. *interrupta* Uh. prothorace in totum nitende, fronte longiore quam lata, oculis minus convexis.

Der *C. fasciata* ab. *interrupta* Uh. (56 : 230) ausserordentlich ähnlich, unterscheidet sich von ihr :

(1) durch den an den Seiten stärker glänzenden Halsschild. Bei ab. *interrupta* ist er dort matt, nur mitten auf der Scheibe glänzend; (2) durch etwas matt glänzenden Kopf, dessen Augen viel mehr verflacht sind, sie treten aus der Wölbung des Kopfes gar nicht heraus. Stirn deutlich länger als breit. Bei ab. *interrupta* ist die Stirn nicht länger als breit und ganz matt.

Holotypus : Die schwarze Ankerzeichnung in 3 Flecke aufgelöst : ein grosser Schildchenfleck bis zur 1. Rippe, der sich an der Spitze verschmälert, 2 dreieckige Seitenflecke, deren Spitze kaum die 2. Rippe erreicht. Zwischen der 1. und 2. Rippe ist der Anker unterbrochen. Spitzenfleck auf dem Enddrittel (28 : 96).

Paratypus : Ankerzeichnung weiter rückgebildet : Schildchenfleck kleiner, Seitenfleck schmal, nur auf dem Seitenrand unter der Schulter. (23 : 81, 29 : 18.)

Bei einem weiteren Paratypus ist die Ankerzeichnung vollständig.

4, BRASILIEN : Sa. Catharina : Nova Teutonia (*F. Plaumann*). Meine Sammlung.

Bei einer weiteren Aberration von *C. plaumanni* fehlt die ganze Ankerzeichnung, nur das Spitzendrittel der Decken schwarz. Dieser Paratypus im Britischen Museum. BRASILIEN : Ilha Santo Amaro nr. Santos. 20.iv.1912 (*G. E. Bryant*).

7. *Clinocarispa subhomalina* sp. n.

Elongata, prothorace subopaco, medio nitidulo, supra nigra, prothorace flavo-testaceo, vittis tribus nigris, lateralibus angustissimis, elytris macula humerali et femoribus dimidio basali flavo-testaceis—*C. fasciata* ab. *homalinae* Uh. (56 : 228) simillima, sed antennis ad apicem incrassatis, non fusiformibus; prothorace minus alutaceo, punctis distinctis inter se separatis.—Variet vitta transversali accessoria postmediana.—6·5-7·5 mm.

Diese Art ist in ihren dunkelsten Stücken der *C. fasciata* Ws. ab. *homalina* Uh. zum Verwechseln ähnlich. Der Hauptunterschied liegt in den Fühlern, die schon bei einfacher Betrachtung von denen der *C. fasciata* abweichen. Bei *C. fasciata* sind die Fühler von der Schmalseite betrachtet schwach spindelförmig, denn die Endglieder sind so zusammengedrückt, dass schon Glied 10 von der Basis zur Spitze dünner wird. Von der Schmalseite erscheint es daher länger als breit (Vergrösserung 25). Bei *C. subhomalina* sind die Fühler schlanker, Schmal- und Breitseite sind kaum zu unterscheiden, Glied 10 quer. Der Halsschild ist gebaut wie bei *C. fasciata*, aber die Trennungswände der Punkte sind durch Scha-

grün nicht verwischt, sondern ziemlich scharf, in der Mitte glänzend. Diese beiden Unterschiede sind zwar recht fein, müssen aber zur Trennung beider Arten genügen, da diese schon bei einfachem Studium für verschieden gehalten werden. Hierzu kommt noch das eigentümliche Verhalten der Färbung auf den Decken. Beim dunkelsten Stück, dem Holotypus sind sie bis auf die gelbbraunen Schultern schwarz. Bei Betrachtung unterm Mikroskop direkt von oben befindet sich auf der 1. Rippe hinter der Mitte ein kleiner dunkelbrauner Fleck, der dann bei 3 weiteren Stücken immer deutlicher wird, bis er mit blossem Auge sichtbar ist. Beim Holotypus tritt in gleicher Höhe ein kleiner, undeutlicher, dunkelbrauner Seitenfleck auf. Bei 4 weiteren Stücken verbreitern sich die Flecke bis sie schliesslich eine schmale Querbinde bilden. Dann gleichen sie (1) der Nominatform von *C. fasciata* Ws., man wird aber kaum so gezeichnete Stücke beider Arten für zusammengehörig halten; (2) der *C. vinculata* Ws., von der sie nur zu unterscheiden sind einmal durch das Fehlen des Metallschimmers auf den Decken und ferner durch ihre schmale Querbinde. Die Ränder der Binde laufen parallel und divergieren nicht wie bei *C. vinculata* und *C. fasciata* am Deckenrande.—Schenkelbasis gelbbraun, zuweilen nur die Schenkelspitze dunkel. Halsschild gefärbt wie bei *C. fasciata*, mit der auch die Skulptur der Decken übereinstimmt (56 : 228).

8, BRASILIEN : Pernambuco (*A. Fry*).

8. *Chalepus cautus* Ws.

Eine farbveränderliche Art. 1, Brasilien. Nur ein kleiner Schulterfleck hell.

1, BRASILIEN : Rio Tapajoz. iii.1874 (*Trail*). Dieses Stück hat ganz schwarze Decken, die nur an der Schulter rötlichbraun sind. Der schmale schwarze Saum entlang der Schulter-Seitenzeichnung kann ganz schwinden oder bis auf einen kleinen Fleck unter der Schulter rückgebildet werden.

9. *Chalepus cordiger* Chap.

Aberration : Halsschild mit breiter schwarzer Mittelbinde. 1, BRASILIEN : São Paulo (*G. E. Bryant*).

10. *Chalepus viduus* Ws.

1, ECUADOR : Macas (*Buckley*).

11. *Chalepus badeni* Chap.

Aberration. 3, B.W. INDIES : Trinidad (*Bryant*). Vergleiche auch 61 : 615.

12. *Xenochalepus cephalotes* Chap.

1 ♂, BRIT. GUYANA : Kartabo. vii.1922 (*Mrs. M. D. Brindley*).

13. *Temnochalepus lugubris* Chap.

1, BRASILIEN : Pernambuco (*A. Fry*). Die beiden Mittelbinden des Halsschildes sind fast zu einer einzigen verschmolzen. Die normale, gelbbraune Trennungs-Mittelbinde kaum noch erkennbar.

14. *Oxychalepus insignitus* Chap.

1 ♀. Weise sah den Typus. Die Art ist der ab. *mendax* Ws. recht ähnlich, aber der Seitenrand der Decken ist an den Hinterecken breiter verflacht (von Fühlerbreite).

15. *Uroplata severini* Ws.

2, AMAZONAS.

16. *Uroplata obscurella* Ws.

2 ♂♂, 1 ♀, British West Indies: Trinidad (G. E. Bryant). Merkwürdige Verbreitung.

17. *Sternothispa* gen. n.

Generi *Octhispa* similis, sed prosterno ad os producto ut in *Sternostena* Ws. et *Sternoplispa* Uh. (54: 237), ungula in utroque latere dente parvo. Antennis indistincte articulatæ, articulis 7 vel 8.

Genotypus: *S. gracillima* sp. n.

Diese neue Gattung scheint zunächst nahe an *Octhispa* zu gehören, unterscheidet sich aber von ihr durch die Bildung der Vorderbrust, die zum Munde zu erweitert vorgezogen ist, sodass dieser sich teilweise darunter verbergen kann. Auch mit *Sternoplispa* hat sie Ähnlichkeit, und ich habe geschwankt, ob sie nicht mit dieser Gattung identisch sei. Als trennende Merkmale sehe ich (1) den nicht dreigeteilten Vorderrand der Vorderbrust und (2) die Fühler an. Sie sind bei *Sternothispa* undeutlich 7 oder 8-gliedrig, die Nahte sind auf dem letzten Glied nur sehr schwach erkennbar. Bei *Sternoplispa* sind die 11 Fühlerglieder deutlicher zu unterscheiden, obwohl die Glieder 8–11 bei manchen Arten (*opacicolis* Uh. unter *Octhispa* beschrieben 51: 58) sehr dicht aneinandergerückt sind. Da die Trennung der Gruppen Chalepini und Uroplatini, soweit sie nur auf die Zahl der unterscheidbaren Fühlerglieder gegründet ist, sich künftig nicht mehr halten lassen wird, so ist es durchaus möglich, dass *Sternothispa* mit *Sternoplispa* vereinigt wird. Dass die einzige beschriebene Art der neuen Gattung abgerundete Hinterecken der Decken hat, ist belanglos.

Sternothispa gracillima sp. n.

Angusta, elongata, subopaca, brunnea, articulis basalibus antennarum infuscatis, lateribus prothoracis anguste, scuto, humeris nigris, sutura pone sentum et intervallo tertio in medio levissime angustaque infuscatis.—Antennis gracilibus, clavatis; prothorace subquadrato, dense haud profunde punctato; elytris subparallelis, costis tribus integris, intervallis regulariter seriato-punctatis, tertio in humero serie brevi accessoria, margine laterali regulariter serrato, apicali denticulato.—Long. 5·5–6, lat. 1·25 mm.

Langgestreckt, fast parallel, ziemlich gewölbt, nicht glanzend, schagriniert. Braun, Fühlerglied 1–3 oder 2–5 angedunkelt, schwarz: Seiten des Halsschildes sehr schmal, beim Cotypus kaum sichtbar, Schildchen, ein kleiner Fleck auf den Schultern; hinter dem Schildchen ist die Naht sehr fein schmal angedunkelt, ebenso in der Mitte des 3. Zwischenstreifes ein feiner Strich.—Fühlerglied 1–5 schlank, 1–2, jedes länger als breit, 3 so lang wie 2, aber schlanker, 4–5, jedes kürzer als 3, 6 schwach quer, vom 7. Glied Fühler keulig verdickt. Glied 7 undeutlich vom 8. getrennt, letzteres mit sehr schwachen Nähten, Spitze asymmetrisch nach innen gerichtet.—Kopf mit glatter, ebener Stirn, am Augenninnenrand mit feiner, eingegrabener Linie. Kopfschild flach, vor den Fühlern nur wenig in der Seitenansicht vorspringend. Augen wenig gewölbt, Hals nicht abgesetzt.—Halsschild fast quadratisch, mit schwach gerundeten Seiten, in der Mitte am breitesten, mit spitz vorspringenden Vorderecken, dicht, aber nur flach punktiert, vorn Hinterrand mit Quereindruck, Mittellinie sehr fein, vorn und hinten abgekürzt.—Schildchen quadratisch.—Decken hinter den Schultern allmählich verschmälert und ebenso zur Spitze wieder verbreitert, fast parallel. Hinterecken völlig abgerundet, Spitze kaum einzeln abgerundet. Seitenrand regelmässig gesägt, Hinterrand gezähnt, mit 3 scharfen, vollständigen Rippen, die äusserste fein gezähnt. Zwischenstreifen mit regelmässigen Doppelreihen, Punkte teilweise schwach quer, auf der Schulter im 3. Streif eine kurze Zusatzreihe, einige Skutellarpunkte

da.—Beine einfach, Mittelschienen kaum gekrümmt. Klauen das Toment des 3. Fussgliedes überragend. Klauenglied wie bei *Sternoplispa* mit einem Zähnnchen vor jeder Klaue.

2, BRASILIEN : Petropolis, ii.1857 (*J. Gray*), coll. Baly.

18. *Octhispa lineola* sp. n.

Elongata, parallela, flavo-testacea, antennis nigris, capite et lateribus prothoracis et margine elytrorum latissime nigro-cyaneis, vitta marginali elytrorum intus sinuate terminata, unguis apiceque abdominis infuscatis.—Fronte laevi, opaca; prothorace subquadrato, punctato, nitido; elytris nitidis, regulariter tricostatis, intervallis regulariter bifariam punctatis, intervallo quarto seriebus medio paene conjunctis, apice leviter singulatim rotundatis, margine laterali minute et regulariter serrato, apicali irregulariter denticulato.—5.5 mm.

Der *Octhispa angustula* Ws., deren Holotypus mir vorliegt, sehr ähnlich und mit der mir unbekannten *O. nigriceps* Ws. sehr nahe verwandt. Ausser in der Färbung unterscheidet sich *O. lineola* von *O. angustula*: durch andere Bildung des Kopfschildes (siehe unten), ferner: Stirn matt schagriniert; mit kurzer Skutellarreihe; vor jeder Klaue ein deutliches Zähnnchen.—Gelbbraun, Fühler schwarz; schwarz mit blauem Schein: Kopf; eine breite Binde auf den Halsschild-Seiten, sodass in der Mitte nur eine nach vorn verschmälerte Mittelbinde gelbbraun bleibt; eine Seitenbinde der Decken. Diese Seitenbinde ist nach innen buchtig begrenzt, sie reicht im ersten Deckendrittel bis an die 3. Punktreihe heran, im 2. Drittel verbreitert sie sich und bedeckt ein Stück der 1. Rippe, im Enddrittel verschmälert sie sich auf ein kurzes Stück bis auf die 6. Reihe, die Deckenspitze bleibt breit dunkel, diese Färbung zieht sich auf der Naht etwas nach vorn, sodass die helle Mittelbinde hinten zweiteilig ist.—Fühler wie bei *O. angustula*, etwas kräftiger. Glied 1-6 bei beiden Arten langserieft. Kopfschild im Profil erhoben, vorn zum Mund nicht so schräg abgeschnitten wie bei *O. angustula*. Halsschild und Decken bei beiden Arten fast gleich. 2 und 3. Rippe bei beiden hinten vereinigt.

4 Stück: 2, AMAZONAS (Holotypus), 1, Santarem, 1 Villa nova (alle coll. Baly).

19. *Octhispa gentilis* Ws.

3, AMAZONAS (coll. Baly. *haematospila*).

Afrika.

20. *Oncocephala senegalensis* Guér.

1, SIERRA LEONE: Niala an *Ipomaea batatas*. 6.xii.1934 (*E. Hargreaves*).

21. *Oncocephala gestroi* Ws.

4, W. DARFUR: S. Jebel Murra, Kallikitting, 4450 ft. vi.1932 (*M. Steele*). Neue Verbreitung.

22. *Decispella monochiri* Uh.

1, ANGOLA: Luimbale, Mt. Moco, 1800-1900 m., iii.1934. Mit grünem Metallschimmer. Neue Verbreitung.

23. *Dactylispa tenuicornis* Chap.

1, NATAL: Durban. 1901 (*Bell Marley*). 3, E. CAPE PROV.: Katberg (*R. E. Turner*). Decken mit Ausnahme der braunen Striche metallisch.

24. *Dactylispa discreta* Ws.

1, BECHUANALAND : Lake Ngami : 2, E. CAPE PROV. : Katberg, 4000 ft. x.1932 (R. E. Turner). Oberseite der letzteren beiden Stücke braun.

25. *Dactylispa pallipes* Kr.

1, SIERRA LEONE. 1, GUINEA : R. Niger (coll. A. Fry).

26. *Dactylispa pubicollis* Chap.

3, ANGOLA : Congulu, iv.1934 (K. Jordan). 2, ANGOLA (coll. A. Fry). 1, BRIT. O.-AFR. : Embu (G. St. J. O. Browne). 3, KAMERUN.

27. *Dactylispa vexatrix* Pér.

1, E. CAPE PROV. : Katberg, xi.1932 (R. E. Turner).

28. *Platypria transvaalensis* Pér.

4, E. CAPE PROV. : Katberg (R. E. Turner). Bei diesem Stück sind der 4. Dorn des Humerallappens und der hintere Abschnitt des letzteren hell.

Asien.

Das hier behandelte Material entstammt der Ausbeute der "Oxford University Expedition" (B. M. Hobby and A. W. Moore) nach Sarawak.

29. *Botryonopa concinna* Gest.

2, SARAWAK, foot of Mt. Dulit, junction of rivers Tinjar and Lejok. 23.ix.1932. Old secondary forest.

30. *Botryonopa dulitana* sp. n.

B. kleinei Uh. simillima, sed prothorace sericea, macula apicali elytrorum marginem apicalem attingente. 15.5 × 5.5 mm.

Der. *B. kleinei* Uh. (1931, Zool. Meded., 13 : 178) aus Borneo sehr ähnlich, Halsschild aber seidig glänzend, und der Spitzenfleck der Decken die Spitze ganz bis zum Rand bedeckend. Alle anderen Angaben von *B. kleinei* auch für *B. dulitana* geltend.

♂. Letztes Sternit seicht ausgerandet, glänzend, punktiert. 2 ♂♂. Fundortangaben wie bei 29.

31. *Agonia spathoglottis* Uh.

1, SARAWAK : Mt. Dulit, 3000 ft., primitive forest. Halsschild rot, Seitenrand sehr schmal schwarz gesäumt, mit schmäler, schwarzer Mittelbinde. Decken schwarz, neben dem Schildchen ein kleiner roter Fleck beiderseits der 1. Rippe und auf ihr. Spitzenrand mit schmalem, rotem Saum. Neu für Borneo.

32. *Agonia dulitana* sp. n.

Elongata, depressa, nitidula; rufo-testacea, antennis, mandibulis, tarsis nigris, elytris nigro-coeruleis, apice anguste rufo-testaceis.—Articulis 2–11 antennarum elongatis, tertio

articulo parum longiore quam ceteris; fronte laevi; prothorace transverso, dense punctato-sulcatulo, medio area laevi, utrinque carinato, lateraliter et postice impressionibus haud profundis; elytris costis tribus integris, intervallis transversim costulatis, biseriatim punctatis, secundo intervallo basi duabus striis accessoriis irregularibus, margine apicali rotundato, denticulato.—7·7·5 mm.

Diese Art ist der *A. shelfordi* Gest. ähnlich, besonders in der Bildung des 2. Streifens an der Basis mit seinen 4 Punktreihen.—Rotbraun, Fühler, Mandibeln und Tarsen schwarz, Decken beim Holotypus (7·5 mm.) schwarzblau, beim Paratypus (7 mm.) schwarz mit schmal rotbrauner Basis, Hinterrand beider schmal rotbraun.—Fühler die Schultern der Decken erreichend, mit zylindrischen Gliedern 2–11, das 3. etwas länger als das 2., am längsten von allen, unten 3 oben 4 Glieder ohne dichte Pubescenz, dicht punktiert.—Stirn spiegelglatt, Augen gewölbt.—Halsschild trapezisch, vorn eingeschnürt, gedrängt punktiert und längsrunzelig-gestreift, vorn trennt eine Querreihe von Punkten eine schmale Querfläche ab, hinten eine tiefe Querlinie eine ähnliche Fläche, in der Mitte eine flache, glänzende Längsfläche, beiderseits ein schmaler Kiel, seitlich und vorn Schildchen die Scheibe flach eingedrückt.—Schildchen rundlich, nicht gefurcht.—Decken ziemlich parallel, hinten gemeinsam abgerundet, Hinterrand gezähnt, Seitenrand schmal abgesetzt, mit 3 ganzen Rippen, die Streifen mit Querkielchen und mit Doppelreihen von Punkten, 2. Streif vorn beiderseits verbreitert, dort mit 2 kurzen Zusatzreihen.

1, SARAWAK: Mt. Dulit, 4000 ft. Moss forest. 19.x.1932 (Holotypus).

1, SARAWAK: R. Kapak, tributary of R. Tinjar. 20.x.1932 (Allotypus).
Old secondary forest (*Native coll.*).

33. *Gonophora chalybeata* Baly.

2, SARAWAK, Fundort wie bei 29.

34. *Dactylispa discoidalis* Chap.

1, SARAWAK: Mt. Dulit, 4000 ft. Moss forest. 20.x.1932. Neu für Borneo.

35. *Dactylispa jacobsoni* Uh.

1, SARAWAK, Fundort wie bei 29. Neu für Borneo.

36. *Dactylispa bipartita* Guér.

1, Fundort wie bei 29. Neu für Borneo.

37. *Dactylispa oberthüri* Gest.

2, Fundort wie bei 32, aber: Primitive forest. Undergrowth. 1.x.1932.
Neu für Borneo.

38. *Dactylispa minax* Gest.

1, Fundort wie bei 34.

NEW GENERA OF AFRICAN TRYPETIDAE (DIPT.)

By H. K. MUNRO, B.Sc., F.R.E.S.

Dacus Fabr.**Gymnodacus** subgen. n.

DACINAE allied to *Daculus* Speiser, and *Afrodacus* Bezzi, with free abdominal segments, but differing in having anterior supra-alar and pre-scutellar bristles, but no ciliae on the third segment of the male abdomen. They differ from *Chaetodacus* Bezzi (= *Strumeta* Walker, *teste* Perkins) in the absence of the supernumerary lobe of the wing in the male. There are two scutellar bristles.

Genotype: *Dacus mesomelas* Bezzi, 1908 (syn. *aethiopicus* Munro, 1933), the only species known.

Reference may be made to the tables of the genera of DACINAE given by Perkins (1937, *Proc. Roy. Soc. Queensland*, **48**: 59, couplet 17).

Metidacus subgen. n.

DACINAE with fused abdominal segments allied to *Dacus* s.s.; there is a single anterior supra-alar bristle, one pair of basal scutellars but no pre-scutellars. There is no supernumerary lobe on the wing of the male and the species are further distinguished by the absence of ciliae on the third segment of the abdomen of the same sex.

Genotype: *Dacus lotus* Bezzi, 1924. This is the only species recorded, but another is to be described.

See also Perkins (loc. cit., couplet 13).

Tephrella Bez.

Bezzi, 1913, *Mem. Indian Mus.*, **3**: 151 (*nec* Hendel, 1927, in Lindner, *Die Fliegen*, **49**: *Trypetidae*: 112, *nec* Bates, 1935, *Pan-Pac. Ent.*, **11**: 103-114).

From an examination of two females of *Tephrella decipiens* Bez. kindly lent by the Director, Zoological Survey, Indian Museum, Calcutta, it is evident that much narrower limits must be given to this genus than Bezzi himself later gave to it. Further, the interpretations given by Hendel and by Bates are incorrect; in the latter case it seems that *Aciurina* Curran may be retained as a good genus for the American species concerned.

Tephrella may be distinguished by the following characters: arista bare; frons pubescent in front; three inferior orbital bristles and the dorso-centrals nearer the line of the anterior supra-alars. There are two basal scutellars and a few setulae at the base of the third vein.

Only the genotype, *T. decipiens* Bezzi, 1913, is included.

Hendrella gen. n.

Tephrella, Hendel, 1927 (*nec* Bezzi, 1913) in Lindner, *Die Fliegen*, **49**, *Trypetidae*: 119.

This generic name is proposed for those European species placed by Hendel under *Tephrella* in 1927. Genotype: *Aciufa caloptera* Lolu, 1850, Hendel's description being accepted. The chief differences between this and *Tephrella* are:—

	<i>Tephrella.</i>	<i>Hendrella.</i>
arista	bare.	pubescent.
frons	pubescent.	bare.
inferior orbitals	three, all strong and brown.	two, strong, brown, rarely an additional white one in front.
superior orbitals	two, strong, brown.	one brown, one white.
dorso-centrals	nearer anterior supra-alars.	nearer suture.
third vein	setulose at base.	bare (setulose at base in <i>basalis</i>).

Dicheniotes gen. n.

Tephrella, p.p. Bezzi, 1924, *Bull. ent. Res.*, 15: 125 (nec Bezzi, 1913).

Similar to *Tephrella* Bezzi, 1913, but with bare frons, pubescent arista, bare third vein and four scutellar bristles. Apparently very like the European species placed in *Tephrella* by Hendel, but these have only two scutellars. It is also very like *Metasphenisca* Hendel, but this has a very long lunule. In the new genus the two superior and three inferior orbital bristles are brown, only the occipital row whitish; frons about half width of head, the fronto-facial angle rounded; lunule short; antennae rather short, third segment rounded at end; face flat, epistome very slightly projecting; proboscis short. Thorax with thick dust on dorsum; bristles normal, brown, dorso-centrals about half-way between suture and anterior supra-alars. Legs and wing normal; third vein bare. Abdomen shining black with slight dust, the sixth segment of the female about as long as the fifth.

Genotype: *Tephrella dispar* Bezzi, 1924.

Unfortunately specimens of all the species placed by Bezzi in *Tephrella*, 1924, have not been seen. One, *T. cyclopica* Bez. (a synonym of *T. gracilipes* (Lw.)) has been made the genotype of *Metasphenisca* Hendel. The species *T. bezziana* End., of which *Aciura latincisa* Bez. seems to be a synonym, appears to belong to the "*Aciura*" group, as does *T. limbata* Bez.; I have seen specimens of both these species. The group is receiving further study. Of *T. rufiventris* Bez., *T. sexfissata* Beck., and *T. tephronota* Bez. no specimens have been available, and the species may be retained here provisionally. Bezzi's species *T. katonae* is common in South Africa, and may be included here although it has slight pubescence on the frons and two or three setulae at the base of the third vein; I have specimens of *T. distigma* Bez. from Southern Rhodesia (from the South African Museum) and of *T. distigma* Bez. from Southern Rhodesia (from the South African Museum) and of *T. erosa* Bez. from the Belgian Congo (from Sir Guy A. K. Marshall); they are very like one another and certainly congeneric with *T. dispar*, although they do not show wing-pattern dimorphism in the sexes.

Euryphalara gen. n.

A genus belonging to the Tephrellini, and allied to *Tephrella*. The very elongate head and the long, thin palpi and proboscis distinguish it from allied genera.

Head elongate, the cheeks wide (as wide as third antennal segment or more), the epistome projecting snout-like to beyond the line of the antennae, the frons and hollowed face thus very prominent before the eyes; palpi elongate; proboscis very long and thin, the base longer than the lower part of the head and projecting beyond the epistome, labellae as long as base. *Antennae* as long as face, arista pubescent; lunule about one and a half times

as long as wide; frons flat with slight pubescence in front, three inferior and two superior orbitals, ocellars moderate, bristles brownish except upper superior orbital and the occipital row. *Thorax* black, with white pubescence and thick dust, dorso-centrals nearer anterior supra-alars; four scutellars of equal length. Legs normal. Wing with a black pattern with hyaline spots and indentations, almost sub-reticulate, in one species reticulate; third vein bare. *Abdomen* shining black with slight dust barely stronger than "etching," the sixth segment in the female as long as the fifth.

Genotype: *Ensina barnardi* Bezzi, 1924.

Euryphalara barnardi (Bez.).

Bezzi, 1924, *Ann. S. Afr. Mus.*, **19**: 547, pl. xiv, f. 96, wing; 1924, *Bull. ent. Res.*, **15**: 136 (*Ensina*); Munro, 1929, *Ann. S. Afr. Mus.*, **29**: 22 (*Ensina*).

This species seems to be not uncommon in South-West Africa. In well-preserved specimens a median and a pair of dorso-central, shining, brownish stripes are to be seen on the dorsum of the thorax.

Euryphalara barnardi (Bez.) *extensa* var. n.

Closely similar to *E. barnardi*; in the type the dorsal brown thoracic stripes are much stronger and stripes appear over the wing bases as well, and the femora are blacker. The chief difference is in the wing-pattern, which is blacker with the hyaline spots less developed; at the base the black extends broadly over the sixth vein into the anal cell, reaching the wing margin (in *E. barnardi* it barely crosses the sixth vein).

Type ♂ and one ♂ paratype, Zebediela, Transvaal, May 1935, I. B. Kok. (To be deposited in the S. African National Collection.)

Euryphalara mecistocephala (Mro.).

Munro, 1929, *Ann. S. Afr. Mus.*, **29**: 22, pl. I, f. 9, wing (*Ensina*).

Only the male type in the South African Museum, Capetown, is known.

Euryphalara reticulata (Mro.).

Munro, 1929, *loc. cit.*; **24**, pl. I, f. 10, wing (*Ensina*).

In this species the head is identical with that of others included in the genus, the checks being very wide. The wing-pattern is, however, reticulate and the body coloration pale, the abdomen entirely reddish (rather discoloured in the type), but probably similar to the reddish abdomens found in some species of *Pliomelaena* in which the abdomen is normally shining black.

Telaletes gen. n.

The species described by Loew* as *Trypeta ochracea* seems to be in an isolated position. Bezzi placed it in *Acanthiophilus*, a genus with which it has little affinity. Since the sixth segment of the female abdomen is as long as the fifth, and the occipital bristles are thick and whitish, the species may be included in Hendel's TEPHRITINAE. Two points must, however, be noted: the third vein is setulose at the base, and the frons pubescent in the middle. In spite of these two characters being present together and both relatively strong, the species may be included in the tribe Tephritini, and seems more nearly allied to *Sphenella*

* Loew, 1860, *Berlin. ent. Z.*, **5**: 295, f. 25.

than to any other genus. The latter has the frons pubescent in the middle, but the third vein is bare, and *T. ochracea* lacks the short row of setulae at the end of the hind femora.

Further, the head is of normal shape, about as long as high, the occiput moderate below and the frons half the width of the head; cheeks and genae moderate, former half width of third antennal segment, the epistome prominent; third antennal segment rounded at end, arista microscopically pubescent. Thorax normal, bristles brownish to pale, pteropleural, one mesopleural and sternopleural present, the dorso-centrals slightly before the anterior supra-alars. Scutellum flat above with four bristles, the apicals slightly the shorter. Legs normal. Wing normal, third vein setulose at base, upper cross-vein beyond middle of discal cell; anal cells with moderate point. Abdomen normal.

Genotype :—*Trypeta ochracea* Loew, 1860, the only species.

Mesoclanis gen. n.

This genus is to include those species placed by Bezzi * in *Ensina* in 1924 and referred to as belonging to the "dubia" group. Their inclusion in *Paroxyna* Hend. has been considered, but, although very similar to species of this genus in many details, they may be differentiated by certain characters.

The head is elongate, about one-third longer than high (about as long as high in *Paroxyna*, except in *P. sororcula* Wied.); there is a shining median stripe on the frons and always a little pubescence before the semi-circular lunule (both rarely in *Paroxyna*); there are two superior and two inferior orbitals, occasionally a third inferior; cheeks wide, about as wide as third antennal segment (not as wide, or else narrow in *Paroxyna*); proboscis elongate; palpi elongate, parallel-sided; on the sides of the occiput above the black setulae form a very distinct row, with characteristically one white setula at about one-fourth the length of the row from its lower end (in *Paroxyna* there are usually a few thick, white setulae and the black setulae are more scattered). Thorax as in *Paroxyna*, but usually with a well-marked, broad, brown, median stripe, and a pair of broad, lateral, bluish stripes formed of thick dust. Bristles as in *Paroxyna*, the dorso-centrals about half-way between suture and anterior supra-alars, all brown to black, except the white pteropleural; four long scutellars of equal length (in *Paroxyna* the apical scutellars are apparently never more than half the length of the basals). Legs normal. Wing normal; the third vein with a few setulae at base and at times two or three over the first posterior cell (it is bare in *Paroxyna*); the pattern reticulate and forming in most a characteristic pattern with a more or less completely hyaline bar across the outer third; in one species brown with a few marginal hyaline spots and numerous small, sub-hyaline spots on the disc. Abdomen thickly dusted; also, as in *Paroxyna*, a row of dorsal, sub-median spots which are sometimes more or less fused.

Genotype : *Trypeta dubia* Walker, 1856, the following species also being included :—*Ensina magnipalpis* Bezzi, 1920, *E. hieroglyphica* Bezzi, 1924, *E. cribripennis* Bezzi, 1924, and *E. polana* Munro, 1931.

The species form a biological group associated with the plant *Osteospermum moniliferum* (Compositae) and all, except *M. cribripennis*, have been reared from larvae found in the flowers or seeds. *M. cribripennis* has only been collected on this plant.

* Bezzi, 1924, *Bull. ent. Res.*, 15:135; Munro, 1931, *loc. cit.*, 22:120.

BLATTODEA AND DERMAPTERA COLLECTED BY MR. R. J. H. KAULBACK'S EXPEDITION TO TIBET

By G. BEY-BIENKO, D.Sc.

(Institute of Plant Protection, Leningrad.)

(Communicated by DR. B. P. UVAROV, F.R.E.S.)

THE collection of Blattodea and Dermaptera made by Mr. R. J. H. Kaulback in Tibet during 1935-36 and kindly submitted to me for study by Dr. B. P. Uvarov contains twenty-six specimens, representing four species of Blattodea and three species of Dermaptera. Two species of the Blattodea are described as new, one of them belonging to an undescribed genus.

The collection belongs to the British Museum (Natural History), London, where the types of the new species are preserved.

Blattodea.

Margattea Shelf.

1911. *Margattea* Shelford, *Ent. mon. Mag.*, (2) 22 : 155 (genotype *Blatta ceylanica* Sauss. 1868, from Ceylon).
1929. *Kuchinga* Hebard, *Proc. Acad. nat. Sci. Philad.*, 81 : 39, 41 (genotype *Phyllodromia longealata* Brunn. 1898, from Sarawak).
1931. *Margattea* Rehn, *Trans. Amer. ent. Soc.*, 57 : 302 (redescription of the genotype).

A careful study of both genotypes determined by the late R. Shelford and deposited in the Zoological Institute, Leningrad. [1 ♂ of "*Phyllodromia*" *longealata* Brunn. from Kuching, Sarawak (Dyak coll.) and 1 ♂ and 1 ♀ of "*Phyllodromia*" *ceylanica* Sauss. from Ceylon (O. John coll.)], shows that there is no need for Hebard's genus *Kuchinga*. The two genotypes are quite similar in the venation of elytra and wings, maxillary palpi proportions, armament of the anterior femora, in the structure of the tarsi (in both species covered with fine bristles, tarsal claws equal, unspecialised) and even in general outlines of the head. The same opinion was recently expressed by Hanitsch (1931 *Ann. Mag. nat. Hist.*, (10) 7 : 392).

Margattea inermis sp. n.

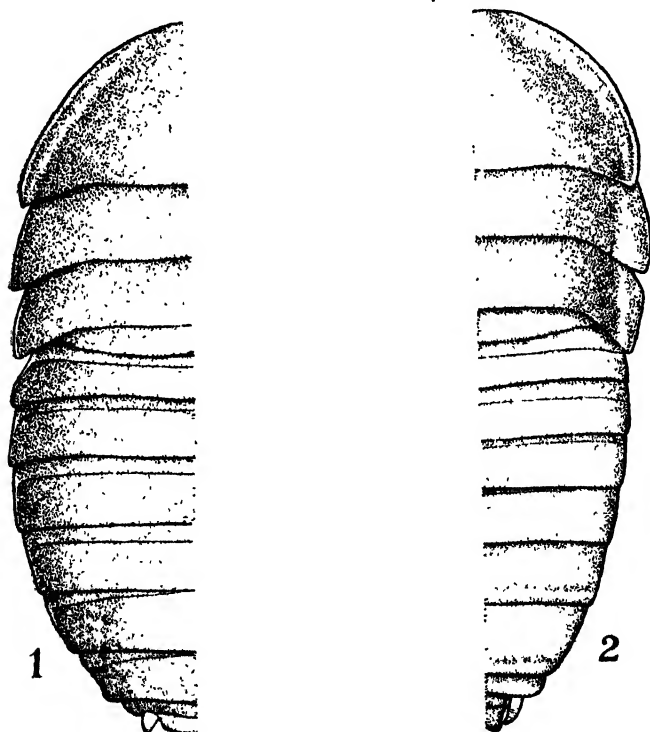
♀. Body relatively small. Vertex with interspace between eyes equal in length to vertical depth of an eye; ocular region of head broadened, with lateral margins convex; facial part with sides straight, indistinctly convergent downwards; maxillary palpi slender, proportions of three apical segments (from the 3rd to 5th) as 1:1:0.8, 3rd segment cylindrical, 4th moderately broadened apically, 5th broader than the preceding ones. Pronotum one and one-third times as broad as long, with very distinct impression placed at the middle of posterior half of disc; lateral margins regularly arcuate; anterior margin very slightly arcuate, practically straight; posterior margin without distinct median production, practically straight; latero-posterior angles distinct, obtuse, moderately rounded. Elytra and wings fully developed, the former distinctly narrowing apically, 3.4 times as long as broad; costal veins 16 in number, R ("discoidal" vein) typical for the genus, not forking in the median part; anal field a little longer than one-third of elytral length (as 1:2.6). Wings with very distinct but not large apical triangle; costal clubbed veins 14 in number; R simple, straight, CuA ("ulnar" vein) with 2 or 3 complete branches (distal part of wing is damaged). Anterior lower margin of anterior femora without thick spines in median part but with an elongate row of closely placed pyliform spines (type C), terminating in two large distal spines; posterior lower margin of the same

femora armed with only two delicate spines in the apical fourth; lower margins of all other femora with sparse delicate spines; tarsi with fine bristles; areola well developed; tarsal claws quite symmetrical, unspecialised. Last abdominal tergite very short, slightly produced on the middle of hind margin, with a feeble median notch; last sternite large, hind margin between bases of cerci slightly rounded.

Upper surface of body, i.e., pronotum and elytra, ochraceous, with a feeble orange tinge; elytra with immediate apex darkened, brown; wings with costal field ochraceous, apical part of preanal area brown, anal area moderately infumated. Lower surface of body, including maxillary palpi; legs and cerci, brownish-black; spines on legs yellowish. Length of body ♀ 8.5, pronotum 2.3, elytra 9.1, total length 11.2 mm.

S.E. TIBET: Zayul, 7–12,000 ft., summer 1935, 1 ♀ (type) (*R. J. H. Kaulback*).

This species represents a specialised and aberrant member of the genus *Margattea*, characterised by type C armament of the anterior femora instead of type B. The present knowledge of the genus is, however, insufficient, and therefore I hesitate to describe a new genus on the female sex alone.



FIGS. 1–2.—*Glomerexis tibetana* sp. n.

The known range of the genus is the Indo-Malayan and Ethiopian regions, and the discovery of a member of the genus in Tibet demonstrates a tropical origin of some faunistic elements of Tibet. *Margattea inermis* sp. n. unquestionably represents (as does *Glomerexis tibetana* gen. et sp. n. described below) a specialised and transformed derivative of the Tertiary tropical fauna of Tibet.

Glomerexis gen. n.*

Related to *Pseudoglomeris* Brunn. (PERISPHERIINAE) but differs as follows.

Body completely apterous in both sexes. Vertex with eyes much separated, interspace between them a little broader than width of the 1st antennal segment, ocelli absent in both sexes. Typical carina on the lower surface of pronotum distinct, but its hind end simple, not produced into a tooth. Pronotum similar in both sexes, its latero-posterior angles well developed, slightly produced backwards; meso- and metanotum with lateral parts triangularly produced backwards. Genicular spines on the middle and hind femora very small; anterior lower margin of the middle and hind femora with a strong triangular apical tooth, more developed on hind femora. Abdomen without lateral impressions on the 3-7th tergites; upper surface in ♂ quite flat, in ♀ convex; transverse sulci on 2-4th tergites distinct, on 5-6th tergites feeble and practically concealed, on 7th tergite quite absent.

Genotype *Glomerexis tibetana* sp. n.

Glomerexis tibetana sp. n. (figs. 1 and 2).

♂ (type). Size medium (for the group), form markedly flattened and regularly narrowing from the mesonotum to the apex of abdomen. Head with greatest depth scarcely greater than width across eyes; face with scattered impressed points, without transverse concavity between antennal bases; palpi short, proportions of three distal segments (from 3rd to 5th) as 1 : 0.56 : 0.77; 3rd segment cylindrical; preapical segment moderately widened apically; apical segment thick, inflated. (Antennae broken off.) Pronotum (the left part of which is not completely developed and was probably damaged during the life of the insect) with relatively sparse impressed points, about twice as broad as long; median part moderately convex; lateral parts distinctly expanded, practically flat, latero-posterior angles moderately produced; hind margin distinctly biconcave. Meso- and metanotum taken together a little shorter than pronotum, with denser punctation; hind margins practically straight in the median part of their width; latero-posterior angles more acutely produced than those of pronotum; surface convex, with lateral parts flattened. Legs relatively short, markedly flattened; upper surface of hind tibiae with 13 spines, triseriately arranged, but median row includes 3 spines only; hind tarsus subequal in length to the corresponding tibia. Abdomen strongly deplanate, with both upper and lower surfaces flat; the whole upper surface and basal part of the lower surface coarsely punctured, with irregular and not very distinct transverse rugosities; hind margin of the 2nd tergite slightly concave in median part; 3-7th tergites with hind margins straight, their latero-posterior angles not angularly produced; supra-anal plate about twice as broad as long, median part of hind margin straight, latero-posterior parts rounded, not angular; cerci short, subconical, slightly incurved, not reaching the apex of the supra-anal plate, segmentation distinct; last sternite ("subgenital plate") without styles, moderately transverse, narrowing apically, strongly asymmetrical, dextral part considerably excavated, with margins of that part membranous.

♀. Very similar in general habitus to the same sex of *Pseudoglomeris planiuscula* Sauss. Form ovate, strongly convex above, deplanate below. Pronotum with upper surface polished, with indistinct, feebly impressed but relatively dense points; almost twice as broad as long, hind margin indistinctly biconcave. Meso- and metanotum as in the male sex, punctation more distinct than that on the pronotum. Legs as in the male sex, but hind tibiae with 12 spines on the upper surface. Abdomen with relatively dense, not very deep punctation; almost parallel-sided in basal half; hind margins of the 2-4th tergites slightly convex in median part; latero-posterior angles of the 6-8th tergites not

* i.e. resembling the genus *Glomeris* (Isopoda).

produced posteriorly; supra-anal plate a little more than twice as broad as long, hind margin slightly arcuate, latero-posterior angles distinct but rounded; cerci very short, conical, with indistinct segmentation; last sternite slightly more than twice as long as broad, lateral margins to infra-cercal excision straight, strongly convergent, hind margin (between infra-cercal excisions) quite straight in median part.

Coloration uniformly black, shining, especially in the female sex. Head entirely black; maxillary palpi dark brown; antennae (in the female sex) brownish-black, with apical part dirty-brown. Legs brownish-black. Cerci rufous; supra-anal plate in ♂ dirty-yellowish. Length of body ♂ 19.8, ♀ 20; pronotum ♂ 4.8, ♀ 5.3; hind tibia ♂ 5.5, ♀ 4.4; maximum width of pronotum ♂ ca. 8.5, ♀ 9 mm.

E. TIBET. Dzogang, 9–12,000 ft., 13–21.ix.1936, 1 ♂ (type) and Poshö, 9–12,000 ft., 12–18.viii.1936, 1 ♀ (*R. J. H. Kaulback*) [Female paratype in the Zoological Institute, Leningrad].

This new genus shows a well-pronounced affinity to the widely distributed Indo-Malayan and Ethiopian genus *Pseudoglomeris* Brunn., differing from it in the complete absence of elytra and wings in both sexes. The abbreviation or complete disappearance of these organs in the Tibetan Orthoptera and Dermaptera is the most characteristic feature of many species, both tropical or Palaearctic in their origin; the discovery of an additional apterous species is therefore quite natural.

The new species differs clearly in coloration, dimensions, more convex body and in the sculpture of the upper surface from *Pseudoglomeris dubia* and *P. semisulcata* recently described from Yunnan by Dr. Hanitsch (1925, *J. asiat. Soc. Bengal*, (n.s.) 20 : 337–8, ♀♀ only).

There is some probability that Hanitsch's *Pseudoglomeris semisulcata* belongs to the genus *Glomeris*, but it is impossible to draw a more exact conclusion from the very brief description of Hanitsch's species.

Eupolyphaga yunnanensis Chop.

E. TIBET: Poshö, 9500 ft., 21.vii.1936, 1 ♂, and 12–13,500 ft., 26–31.vi.1936, 1 ♀ (immature?).—S.E. TIBET: Zayul, 10–12,000 ft., vi.–vii.1935, 1 immature ♂ (all specimens collected by Mr. Kaulback).

A widely distributed Chinese species, known also from S.E. Tibet (Chopard, 1929, *Eos*, 5 : 267).

Eupolyphaga thibetana Chop.

E. TIBET: Poshö, 9–12,000 ft., 12–28.viii.1936, 1 ♂, and Lhodzong Poshö, 12,600 ft., 15.vi.1936, 1 immature ♂ (*Kaulback*).

Known only from Tibet.

Chopard in his Monograph of the Palaearctic POLYPHAGINAE (*loc. cit.*, 1929) described both these species without indicating differences in the armament of the anterior tibiae. A careful study of specimens of both species, as well as of the related *E. sinensis* Walk., however, has shown that they may be easily distinguished by the number of spines on the anterior tibiae and in their arrangement. Dr. B. P. Uvarov, who, at my request, studied the armament of the anterior tibiae in the type specimen of *E. thibetana* (deposited in the British Museum), has informed me that it has only 8 spines; the same number was found by me in the specimens collected by Mr. Kaulback.

These three species may be distinguished by the following key.

- 1(4). Anterior tibiae armed with 9 spines. Elytra in ♂ distinctly longer, extending beyond apex of abdomen by not less than 12–15 mm.

- 2(3). Anterior tibiae with 8 apical and subapical spines and with a single isolated median spine placed on the lower margin of the upper (external) surface. Elytra in ♂ with dark spots not isolated, forming continuous dark pattern, with transparent, irregular clear spaces . . . 1. *E. sinensis* (Walk.).
- 3(2). Anterior tibiae with 7 apical and subapical spines and with 2 isolated median spines, one of which is placed on the lower margin and the other on the upper margin of the upper (external) surface. Dark spots of elytra in ♂ small, isolate, dispersed . . . 2. *E. yunnanensis* (Chop.).
- 4(1). Anterior tibiae armed with 8 spines only. Elytra in ♂ shorter, extending beyond apex of abdomen by less than 10 mm. (Median isolated spine on anterior tibiae present, placed on the lower margin of the upper surface, upper spine absent. Dark spots of elytra in ♂ small, isolate, dispersed.) . . . 3. *E. tibetana* Chop.

Dermaptera.

Forficula uvarovi Sem. et B.-Bienko.

CENTRAL TIBET: Salween Valley, Bunithang Gumpa, 12,500 ft., 17.iv.1936, 2 ♀♀.—E. Tibet: Lhodzong Poshö, 12,600 ft., 15.v.1936, 1 ♂; Poshö, 12–13,000 ft., 26–31.vi.1936, 1 ♂; Poshö, 12–16,000 ft., 18–20.vii.1936, 1 ♂; Poshö, 9–12,000 ft., 2–28.viii.1936, 1 ♀; Shopando, Kham, 12,000 ft., 7.v.1936, 2 ♂♂, 2 ♀♀.—S.E. Tibet: Zayul, 12–13,000 ft., 1–10.x.1936, 2 ♂♂, 4 ♀♀ (all specimens collected by Mr. Kaulback).

I found no differences between the present series of specimens and the typical series deposited in the Zoological Institute of the Academy of Sciences, Leningrad.

This species represents a very peculiar Tibetan endemic, distributed from the Amdo district and the range Burchan-Budda on the North-East to the basins of the rivers Mekong and Yan-tze-kiang in Central and S.E. Tibet.

Forficula sp.

S.E. TIBET: Zayul, 12–13,000 ft., 1–10.x.1936, 1 ♀ (*Kaulback*).

Probably a new species characterised by very short but visible alar squamae.

Anechura (*A.*) *filchneri* Burr.

E. TIBET: Poshö, 12–13,000 ft., 26–31.vi.1936, 1 ♀ (*Kaulback*).

Previously known from the provinces Gan-su and Szechuan, so that its presence in E. Tibet is quite natural.

A CORRECTION.

In the paper by H. K. Munro "New Genera of African TRYPETIDAE (Dipt.)" published last month (*Proc. R. ent. Soc. Lond.* (B) 7: 117–120) the genotype of *Hendrella* is incorrectly spelt. The correct name is *Aciura caloptera* Loew, 1850.

A NEW COCCID (HEMIPT. HOMOPT.) FROM MAURITIUS

By E. ERNEST GREEN, F.R.E.S., and RAYMOND MAMET.

Lecanium dorsocillatum sp. n.

Adult female (fig. 1, a) oblong-oval, moderately convex, brownish in colour. Mouth parts small. *Stigmatic clefts* inconspicuous, with three stigmatic spines; median spine stouter. *Parastigmatic pores* small, arranged in a series connecting the spiracles with the stigmatic clefts. *Margin* (fig. 1, e) closely set with long stout and slightly curved cilia. No sub-marginal tubercles. *Antennae* (fig. 1, b) 8-segmented. Formula: 3, 5, 4, (2, 8), 6, 7, 1. Antennal setae longish and slender. *Legs* (fig. 1, c) rather longish and narrow. Coxa (of third leg) stouter; nearly as long as femur, the latter equal in length to tibia. Trochanter furnished with a long slender hair. Tarsus shorter than tibia, being two-thirds the length of the latter. Tarsal digitules very slender and long with conspicuously knobbed extremities. Ungual digitules more conspicuous; shorter and stouter than tarsals, longer than claw, with strongly knobbed extremities. Claw acute and small. *Plates* (fig. 1, d) of anal operculum triangular, as shown in the figure. Anal sac very conspicuous. *Anal ring* with long stout hairs which are longer than the anal sac and projecting beyond it. Anal cleft approximately one-fifth of the total length of the body. *Derm* in the paranal region more sclerotised than in the rest of the body, with small oval or round pores. The *dorsum* (fig. 1, a) exhibits three longitudinal series of long stout cilia which are similar to those of the margin. Intermingled with these cilia are small oval pores. A few short spines are scattered on the frontal and pygidial areas of the dorsum.

Length 3.3 mm. Breadth 1.9 mm.

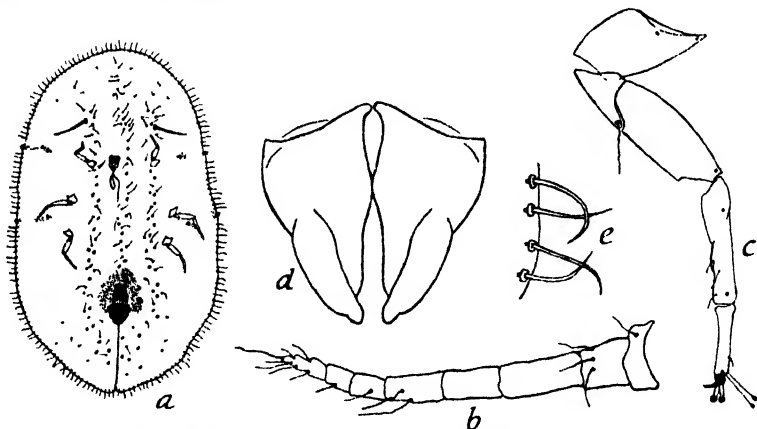


FIG. 1.—*Lecanium dorsocillatum* sp. n. a, adult female showing the longitudinal dorsal series of cilia; b, antenna; c, 3rd leg; d, plates of anal operculum; e, marginal cilia.

MAURITIUS: Rose Hill. On a fern: *Nephrolepis cordifolia*. xi.1934 (R. Mamet).

Remarks: This insect seems to be very rare and has been described from a single adult female. Since it was collected, no other individual has been found in spite of a careful search made in many localities.

A SPECIES OF *SPHAEROCERA* (DIPTERA, SPHAEROCERIDAE) NEW TO BRITAIN

By O. W. RICHARDS, F.R.E.S.

IN my paper on the British SPHAEROCERIDAE (1930, *Proc. zool. Soc. Lond.*, 1930 : 318), I recorded two specimens of a rare species under the name *Sphaerocera coronata* Zetterstedt, 1840. This is one of four rare European species which might be regarded as forming an independent group. In 1930 I placed them in the *S. pusilla* Fall. group (fourth vein not bent forwards, slightly recurved distally, scutellum with about 9 teeth); the group of *S. coronata* also shows these characters but in addition differs as follows: mesonotum centrally (at least in front) with a centre stripe consisting of 2-4 longitudinal rows of small warts, separated by a bare stripe from the lateral wart-covered areas; fore coxae black. In the group of *S. pusilla* Fall. s.s. the mesonotum is evenly covered with small warts or has at most a fine central bare stripe and the fore coxae are yellow.

Duda (1920, *Tijds. Ent.*, 63 : 1-38) described three species of the *S. coronata* group, for which he used the names *S. coronata* Zetterstedt, *S. crenata* (Meigen) and *S. paracrenata* Duda. In 1921 (in Falcoz, *Bull. Soc. ent. Fr.*, 1921 : 140-2), he described a fourth species, *L. falcozi*. Recently I had the opportunity to examine some flies of this group collected by Mr. E. B. Basden and this has enabled me to clear up certain difficulties in their synonymy.

The following key will assist in separating the European species.

1. Mesonotum shining.
(Smallest species, L. 2 mm.; ♂ genitalia small; halteres yellow) *S. micropyga* Duda. 2.
- Mesonotum dull
2. ♂ genitalia large; ♀ fifth tergite with a distal excision only extending half-way across tergite. L. 2.5-4 mm.
(Mesonotum feebly shining; knob of halteres blackish) *S. crenata* (Meigen). 5.
- ♂ genitalia small; ♀ fifth tergite with the central quarter pale and membranous.
- (Mesonotum quite dull; halteres white or yellowish) 3.
3. Length 2-4 mm. Mesonotum with the warts larger, centrally in two regular rows *S. paracrenata* Duda.
- Length 2 mm. Mesonotum with the warts smaller, centrally in two irregular rows *S. falcozi* Duda.

All the above species have hitherto been very rare in collections, probably because (as shown below) they are inhabitants of the nests of birds and mammals situated in very damp places. Mr. Basden's collection from nests includes more specimens of this group than were previously known from the whole of Europe.

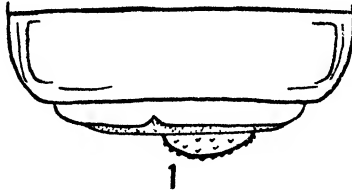
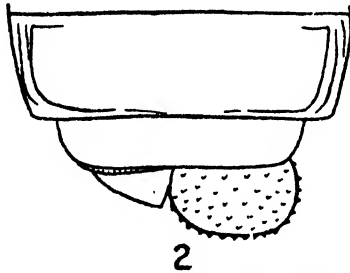
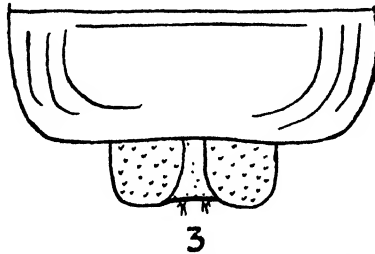
1. *S. micropyga* Duda, 1938.

nec *Borborus denticulatus* Meigen, 1830 = *Sphaerocera nitida* Duda, 1920.
! *Sphaerocera denticulata* Stenhammar, 1855.
S. denticulata Duda, 1920.

I have not seen any specimens of this species and Stenhammar's type requires re-examination. Duda saw four males (three from Germany and one from Austria). Séguin (1934, *Faune de France*, 28 : 453) has reported on Meigen's type.

2. *S. crenata* (Meigen).*Borborus crenatus* Meigen, 1838.*Sphaerocera coronata* Zetterstedt, 1838.

Monsieur E. Séguéy kindly compared a female which I sent him with Meigen's unique female type in the Paris Museum. Dr. N. A. Kemner also was kind enough to compare the same specimen with Zetterstedt's unique female type at Lund. Meigen recorded the species from Bavaria and Zetterstedt states that it is very rare in Lappland; probably he only saw the single female. Stenhammar (1855) also only described the female. Rondani (1880) received one German specimen from Kowarz, and Engel (Duda, 1921) captured one male at Dachau, Germany.

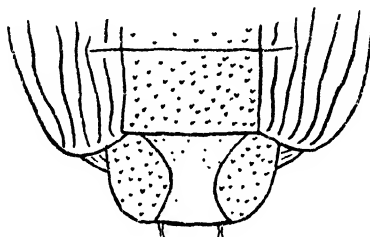
FIG. 1.—Dorsal view of end of abdomen of *Sphaerocera paracrenata* Duda ♂.FIG. 2.—The same of *S. crenata* (Meig.) ♂.FIG. 3.—The same of *S. paracrenata* ♀.

I have seen the following British specimens: 1 ♂ Suffolk West, Ampton, 13 April '12 (*C. G. Nurse*) [Richards, 1930 : 318]; ♂♀ Bucks, Black Park near Fulmer, 15 May '33 (*E. B. Basden*).

Mr. Basden found his two specimens in the nest of a vole, almost certainly *Microtus agrestis hirtus* (Bellamy). The nest was in a tuft of *Juncus*, the bottom of the nest being about 1½ inches from the ground, the surrounding area being very marshy. The nest contained numerous droppings.

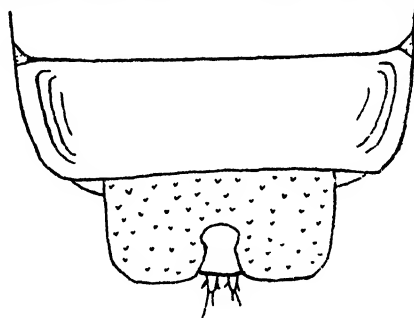
3. *S. paracrenata* Duda, 1920.

Duda described this species from a single female found at Kohlfurt, Germany. In England it seems to be the commonest species, though not hitherto recorded. I have examined the following specimens: ♀ Suffolk West, Barton Mills, 17 April '20 (*J. E. Collin*) [recorded previously as *S. coronata*—Richards, 1930:318]; Berks, Temple, ♀ in nest of moorhen (*Gallinula c. chloropus* (L.)), 30 May '31, 3 ♂♂ in nest of water vole (*Arvicola a. amphibius* (L.)), 7 May '32 (*E. B. Basden*); Bucks, Fulmer, ♂ in nest of reed bunting (*Emberiza s. schoeniclus* (L.)), 10 June '32, Black Park, 2 ♂♂, 4 ♀♀ in nest of coot (*Fulica a. atra* (L.)), 25 May '34, 2 ♀♀ reared from the same nest, 26 June and 10 July '34, ♂ in another coot's nest, 25 May '34, ♂♀ in a nest of probably a moorhen (*Gallinula c. chloropus* (L.)) (if not a coot), 21 May '34, ♀ in nest of great crested grebe (*Podiceps c. cristatus* (L.)), 25 May '34 (*E. B. Basden*).



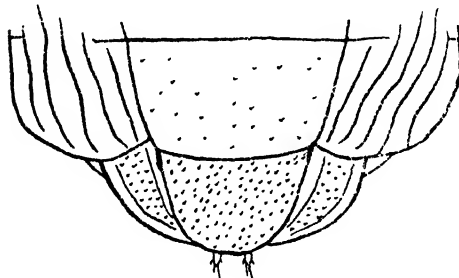
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FIG. 4.—Ventral view of end of abdomen of *S. paracrenata* ♀.



5

FIG. 5.—Dorsal view of end of abdomen of *S. crenata* ♀.



6

FIG. 6.—Ventral view of end of abdomen of *S. crenata* ♀.

4. *S. falcozi* Duda in Falcoz, 1921.

Falcoz obtained one male in the nest of a kingfisher (*Alcedo atthis isipida* L.) in Dauphiné.

The following notes on the structure of the two British species may be of some help in their identification. The length of the British *S. paracrenata* varies from 2 to 3 mm. The mesonotum has a "dorso-central" row of warts and two "acrostichal" rows; the acrostichal rows are 1-2 warts wide, regular in front. The anal cell is usually a little, only in one female considerably, longer than the posterior basal cell. The halteres are white. In the abdomen of the male (fig. 1) the genitalia are not large, the fifth tergite is narrow, incised on the left of the centre of its distal margin and bordered with a white membrane. In the female, the fifth tergite (fig. 3) and sternite (fig. 4) are both divided by distinct membranous areas. I have not been able to compare these specimens with type of *S. paracrenata*, but I think their identity is fairly certain. Duda describes the female fifth tergite as half as long as the fourth, with a yellowish longitudinal depression in the middle. He also states that the anal cell is much longer than the posterior basal cell; one British specimen shows this character but the others do not.

The British specimens of *S. crenata* are rather larger than *S. paracrenata*, 2.5-4 mm. long. The mesonotum has four irregular rows of warts in the "acrostichal" position; the four rows are not segregated into two groups. The anal cell is hardly longer than the posterior basal cell. The halteres are pale brown with the knob blackish. In the abdomen of the male (fig. 2) the genitalia are very large, the forceps being long and narrow, the fifth tergite is relatively long (about half the length of the fourth), the posterior margin is not excised and there is a very narrow membranous margin on the left side only. In the female, the fifth tergite (fig. 5) has a small, subcircular, posterior emargination and the fifth sternite (fig. 6) is evenly sclerotised throughout.

BOOK NOTICE.

Check list of the Cicadellidae (Homoptera) of America, north of Mexico. By D. M. DELONG and J. S. CALDWELL. Pp. iv + 93, 4to. Ohio (Ohio State University), 1937.

This work is printed in imitation typewriting on one side of the paper and bound in stiff paper wrappers.

The check list extends to 82 pages, in which the species are systematically arranged under genera. It succeeds the last published list of American CICADELLIDAE published in 1917 by Van Duzee, which it enlarges from 69 genera and 700 species to 145 genera and over 1800 species. The synonymy given by Van Duzee is not repeated but recent synonymy is indicated. Where deemed necessary, reference to the original description is made and this appears to be given in the great majority of cases.

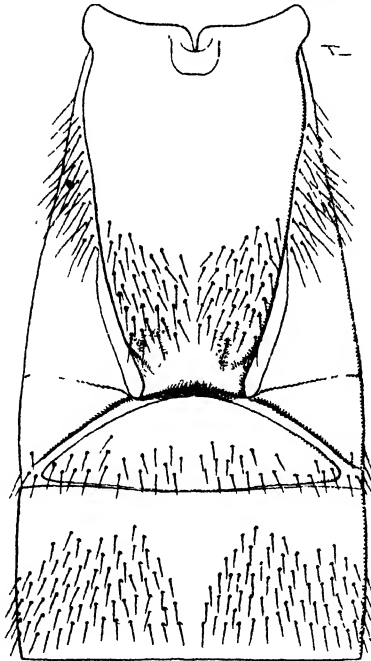
Bibliographical references are made by a number, followed by the volume and page referred to, the number refers to the alphabetical list of journals printed at the end of the volume. By this means references require the minimum space in printing.

A NEW SPECIES OF *APANTELES* (HYM. BRAC.) FROM SOUTH AFRICA

By D. S. WILKINSON, F.R.E.S.

*(Imperial Institute of Entomology.)****Apanteles caesar* sp. n.**

♀♂. Black; front femora in about apical half, front tibiae wholly, front tarsi (save for black feet and for some apical darkened segments), middle femora at apex, middle tibiae wholly (save for darkened apex or sometimes apical half), hind trochantines very occasionally, hind femora at apex, hind tibiae (save for darkened apex), all tibial spurs, and the tegulae, red or red testaceous; wings very strongly infumated evenly throughout, and the setae coloured; costal veins (save basally where they are somewhat red testaceous), stigma, and metacarp, dark brown, the remaining veins brown; stigma uniformly opaque.

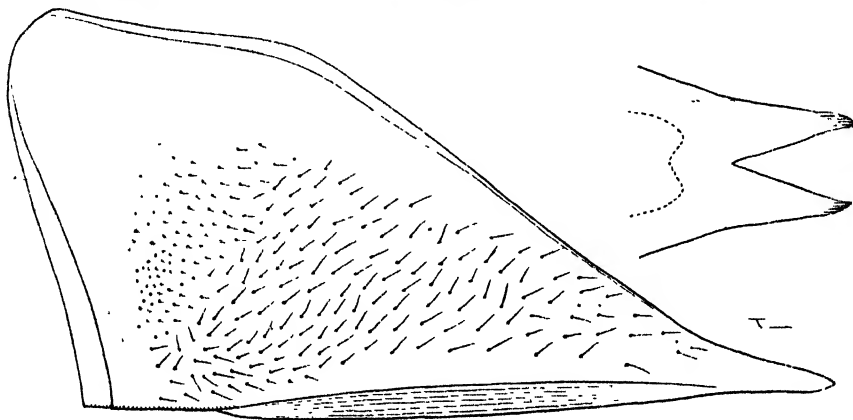


1

FIG. 1.—*Apanteles caesar* sp. n., basal tergites, ♀. × 80.

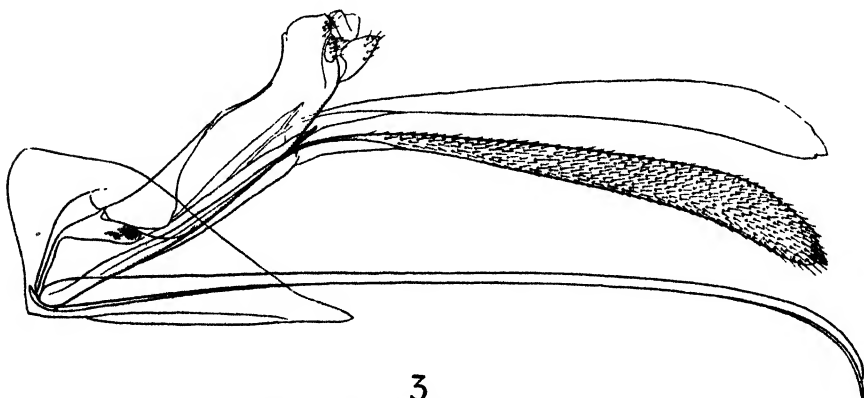
♀♂. *Head*: clypeus and face throughout closely minutely punctate (degree 1); face elongate, the distance from eyes to facial depressions at least 1.5 times as great as distance from apex of clypeus to facial depressions; facial and frontal orbits, frons, and vertex, throughout minutely punctate (degree 1); posterior ocelli equidistant from each other

and the eyes; flagellum of ♀ about equal to combined length of thorax and abdomen, definitely shorter than combined length of head, thorax, and abdomen, of ♂ definitely longer than combined length of thorax and abdomen together with twice the length of the head. *Thorax*: mesonotum and disc of scutellum throughout minutely punctate (degree 1 or 2); the non-excavate area of the lateral faces of the scutellum clearly reaching up well beyond half-way to base of scutellum; propodeon in basal half throughout minutely punctate, in apical half entirely smooth save for some oblique striation along extreme lateral margins and for short striation radiating from the median apical lunule, which is



2

FIG. 2.—*Apanteles caesar* sp. n., hypopygium, ♀: side view, $\times 80$; and its apex, opened out, dorsal view, further much enlarged, to show apical slit.



3

FIG. 3.—*Apanteles caesar* sp. n., genitalia, ♀. $\times c. 34$.

large and strongly raised. *Wings*: metacarp short, equal in length to or even just shorter than the stigma. *Legs*: hind coxae above and on outer faces minutely punctate; the longer hind tibial spur just longer than half, and the shorter spur two-fifths, the length of the basal segment of the hind tarsus. *Abdomen* (figs. 1-3): 1st tergite in about the basal half or three-fifths excavate and smooth, the apical two-fifths turned over and minutely

punctate, across extreme apex smooth, the apical angles with a weak punctiform impression, and the apical lunule weak; 2nd tergite minutely punctate in or throughout the apical half, otherwise smooth, the sulci noticeably more widely divergent in the ♀ and consequently the tergite noticeably broader and shorter than in the ♂; 3rd tergite entirely smooth across base and apex and in a large triangular median basal area, otherwise with very regularly placed, minute punctation; succeeding tergites entirely smooth across base and apex and in a triangular median basal area, otherwise with regularly placed minute punctation, but the smooth triangular area commonly only just indicated; majority of ventrites of ♀ with median longitudinal suture; ovipositor and sheaths elongate, the sheaths as long as the combined length of the hind tibia and the two basal segments of the hind tarsus, the ovipositor as long as the combined length of the hind femur, hind tibia, and four basal segments of the hind tarsus; hypopygium membranously acute.

Length: ♀, 3.7-3.9 mm.; ♂, 4.25 mm.

Described from the following material:—BRITISH MUSEUM: S.W. AFRICA, Aus, 1 ♀ (*type*), 4 ♂♂, xii.1929, S. Africa, Cape Province, Little Karroo, 38 m. E. of Ceres, 2 ♀♀, 1 ♂, 17-25.xi.1924 (*R. E. Turner*).

Type in the British Museum.

Host unknown.

Cocoons unknown.

In my key (1932, *Trans. ent. Soc. Lond.*, 80, and as subsequently emended) I am running this striking species to couplet 109, which should be altered as follows:—

- | | | | | | |
|-------|--|---|---|---|----------------------|
| 109. | Ovipositor sheaths definitely longer than hind tibia | . | . | . | 109a |
| | Ovipositor sheaths rather shorter than hind tibia | . | . | . | 121 |
| 109a. | Face elongate; wings very strongly infumated throughout; | | | | |
| | S. Africa | . | . | . | <i>caesar</i> Wilkn. |
| | Not so describable | . | . | . | 110 |

BOOK NOTICE.

Die palaarktischen Colletes-Arten. By J. NOSKIEWICZ (Prace Naukowe Lwow (2) 3). Lwow, 1936. pp. 532, 28 pls., 40 figs.

This book is the first attempt at a systematic revision of the genus *Colletes* (Hymenoptera) of the Palaearctic region.

It gives a detailed description of the genus, followed by a chapter on the geographical distribution of the species, and this is succeeded by the main part devoted to a taxonomic study of the 123 species recognised by the author, who divides the genus into four subgenera, two of which he describes as new. Fifty-six new species are described in the book, and two more in an appendix. Two keys are supplied (one for ♀♀ and one for ♂♂), each of which runs to some 120 couplets.

The description of the species occupies over 400 pages, and is followed by a list of indeterminable species, the index and a supplement giving the description of two further new species received during the printing of the book.

NEW SPECIES AND VARIETIES OF *MISCHOCYTTARUS* (HYMENOPTERA, VESPIDAE)

By J. BEQUAERT.

(*Museum of Comparative Zoology, Cambridge, Mass.*)

Communicated by O. W. RICHARDS, F.R.E.S.

Mischocyttarus ater var. *uniformis* var. n.

♀. Agrees structurally in every respect with *M. ater* (Olivier), but differs in the colour of the wings. The apical third of the fore-wing is not milky-white as in the typical form of the species, but infuscated throughout, though slightly and gradually paler than the remainder of the wing.

TRINIDAD, one ♀, holotype, 20.v.1933 (*D. Vesey-FitzGerald*, No. 1952). Holotype in the Museum of Comparative Zoology, Harvard.

I have not seen typical *M. ater* from Trinidad.

Mischocyttarus fitzgeraldi sp. n.

Related and superficially similar to *M. ater* var. *uniformis*, but readily distinguished by the much more slender first abdominal segment.

♀. Head practically as in *M. ater*. Occiput strongly margined. Oculo-malar space at narrowest one-quarter as long as width of antennal socket. Clypeus about one and one-third times as wide as long, with a slight concavity near the weakly projecting, simple, broadly rounded apex. $\frac{POL}{OOL} = \frac{3}{4}$. Mandibles with lower edge sharp for proximal half.

Thorax more elongate than in *M. ater*. Pronotum with a lateral fovea; anterior margin sharply raised but not hook-like below, preceded by a slight furrow, the posterior margin of which is obtuse; anterior margin of propisternum strongly raised; keel of collar strong, more lamellate than in *M. ater*, broadly interrupted medially. Upper division of metapleuron subacutely produced along meso-metapleural suture. Propodeum with the concavity much narrower than in *M. ater*, triangular in outline and not reaching the post-scutellum. Mid tibiae with two spurs. Hind tarsi and hind claws as in *M. ater*. Hind-wing with 10 or 11 hamuli. First abdominal segment long and slender in profile, only slightly shorter than the thorax and about one and one-half times the length of the second tergite, gradually and moderately thickened in apical half; seen from above, the basal half is narrow and parallel-sided, the apical half gradually widened, the apex being about three times as wide as the base; the spiracles, placed about midway, form slight, blunt, lateral protuberances. Sculpture and pubescence as in *M. ater*.

Colour almost exactly as in *M. ater* var. *uniformis*. Black, with clypeus, inner and outer orbits and mandibles somewhat blotched with dark ferruginous. Spurs of all tibiae dirty-white. Wings fairly uniformly infuscated, slightly paler over apical third of fore-wing, the extreme tip somewhat whitish.

Length (h. + th. + t. 1 + 2) : 10.5 to 11 mm.; of fore-wing : 10.5 mm.

TRINIDAD, ♀ holotype and two ♀♀ paratypes, apparently from the same nest, iii.1935 (*D. Vesey-FitzGerald*, No. 4078). Holotype in British Museum; paratypes in Museum of Comparative Zoology, Harvard.

PROC. R. ENT. SOC. (LOND.) (B) 7. PT. 6. (JUNE 1938.)

***Mischocyttarus metathoracicus* var. *picturatus* var. n.**

♀. Agrees structurally with *M. metathoracicus* (H. de Saussure). Head mostly reddish, except for the blackish ocellar area. Pronotum reddish along collar and over vertical sides. Upper corner of mesepisternum (near base of wing) reddish with a small yellow spot. Lower plate of metapleuron reddish. Hind margin of pronotum, sometimes anterior margin of scutellum, postscutellum, two large spots on propodeum, narrow apical margins on all or most of the abdominal segments, spots on the coxae and tips of all femora, pale yellow. Wings as in the typical form.

Length (h. + th. + t. l + 2) : 9 mm.; of fore-wing : 9.5 mm.

BRAZIL : Corumba, Est. Matto Grosso, ♀ holotype (*Herbert Smith*). Chapada, Est. Matto Grosso, ♀ paratype (*Herbert Smith*). Holotype in the Carnegie Museum, Pittsburgh; paratype in the Museum of Comparative Zoology, Harvard.

These two specimens were recorded by Fox (1898, *Proc. Acad. nat. Sci., Philad.* 1898 : 450) as *Polybia rufidens* H. de Saussure. That Mexican species differs, however, from *M. metathoracicus* in many structural characters, notably in the long oculo-malar space and in having the occiput not margined.

A NEW GENUS AND SPECIES OF SUMATRAN REDUVIIDAE (RHYNCHOTA)

By N. C. E. MILLER, F.R.E.S., F.Z.S.

(*Entomologist, Department of Agriculture, S.S. and F.M.S.*)

THE single specimen for which a new genus has been erected was collected by Mr. C. J. Brooks in Sumatra, and has been deposited in the British Museum (Natural History).

It was hoped that precise information regarding its habitat would be available, but, unfortunately, the collector was unable to give more exact details than that it was captured in jungle country.

In my opinion, its habitus suggests that it may frequent decaying vegetation on the jungle floor or perhaps rotting tree trunks.

This new genus appears to be related to the genus *Physorhynchus* auctt., which it resembles as regards size of the prothorax in comparison with the meso and metathorax together, and also the general form of the abdomen.

***Xenorhyncocoris* gen. n.**

Apterous. Head much longer than thorax; ocelli absent; rostrum extending beyond anterior coxae. Antennae a little longer than head. Prothorax about four times as long as meso and metathorax together; prosternum strongly acutely produced posteriorly. Abdomen broadly dilated; 1st abdominal spiracle visible from above. Anterior and median tibiae with a short spongy furrow.

Genotype : *Xenorhyncocoris caraboides* sp. n.

***Xenorhyncocoris caraboides* sp. n. (fig. 1).**

Colour. Dark piceous, paler ventrally. Segments 3 and 4 of antennae pale castaneous. Tarsi castaneous. Produced portion of prosternum fulvous; stridulatory furrow reddish castaneous. *Structure.* Antennae; segment 1 feebly curved, thicker apically than basally, 4 mm.; segment 2 feebly curved, slender, feebly setose in apical half, 6 mm.;

segments 3 and 4 together cylindrical, somewhat densely setose, together approximately 1.5 mm.; there appears to be a rudimentary segment between 2 and 3 and 3 and 4. *Eyes* small, feebly prominent, reniform. *Head* broader in front than behind eyes; surface transversely rugulose; antennal tubercles prominent; clypeus in basal half with sub-parallel, feeble, longitudinal sulci sub-dorsally; gular region regularly transversely sulcate; 1st segment of rostrum sinuate in profile, strongly dorso-ventrally compressed; 2nd segment incrassate, sub-quadrate in cross section; 3rd segment short, strongly constricted laterally, basally. *Thorax*: anterior lobe globose, rugulose in basal half, remainder smooth; longitudinally, arcuately sulcate laterally and sub-laterally, narrowly longitudinally sulcate mid-dorsally; scutellum with a short conical tubercle apically laterally; apex of produced

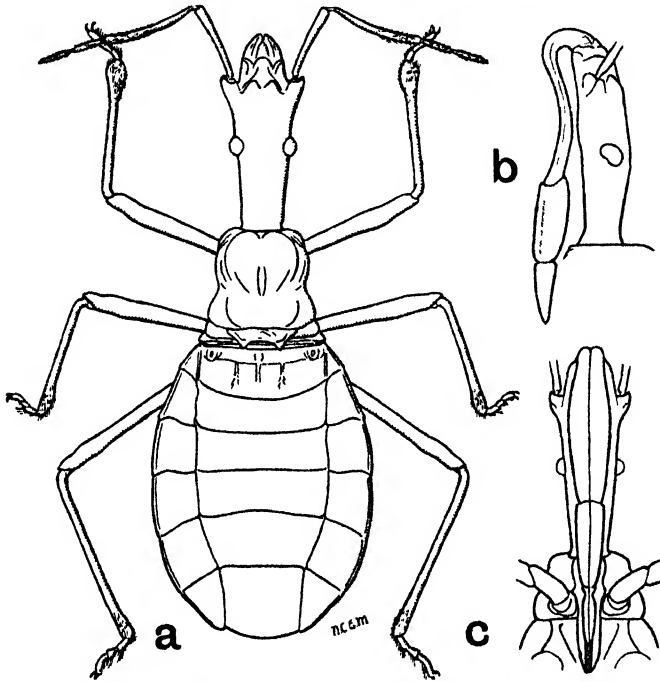


FIG. 1.—*Xenorhyncocoris caraboides* sp. n. a, from above; b, head from the side; c, head from below.

portion of prosternum extending to posterior margin of median coxal cavities, margins finely setose; metathoracic gland ostiole circular, adjacent to anterior margin of posterior coxal cavity, sub-ventrally. *Abdomen* in outline ovate; connexival areas broadly dilated and strongly deflected upwards, longitudinally sulcate laterally; segment 2 with short longitudinal carinae dorsally and sub-dorsally; surface dorsally and ventro-laterally rugulose, mid-ventrally smooth; intersegmental areas between segments 2–5 with short longitudinal carinae. *Legs* somewhat slender; femora constricted apically; anterior and median tibiae thickened apically and with an ovate spongy furrow; tibiae densely setose on inner surface apically; tarsi with short and long setae on inner surface.

Total length 37.0 mm. Length of head 14.0 mm.

Described from 1 (type). W. SUMATRA: Lebong Tandai, 1920–23 (C. J. Brooks).

ADDITIONS TO THE FAMILY AMPHIPTERYGIDAE (ORDER— ODONATA)

By Lt.-Col. F. C. FRASER, I.M.S. Retd., F.R.E.S.

THE Legion *Amphipteryx* was founded by Selys in 1853, as the 6th of the subfamily CALOPTERYGINAE, to accommodate the unique genus *Amphipteryx* Selys. In 1859 Selys added two more genera, *Devadatta* and *Diphlebia*, to the Legion which he now numbered as the 4th of the subfamily. It is interesting to note here that Selys, both in 1853 and 1859, mentioned that *Philoganga* appeared to be related to *Amphipteryx* and might possibly be accommodated in the same Legion. As will be seen in the sequel, his foresight has proved to be correct.

In 1909, Förster added a fourth genus, *Pentaphlebia*, to the Legion, and in 1926 Tillyard gave the Legion family rank. To the four genera which comprise it, I now add the genus *Philoganga* and, with but little doubt, the fossil genus *Steleopteron* Handl.

The family is of peculiar interest as, in it, one first comes across evidence of the passage of the Zygoptera from a Coenagrioid to an Agrioid type. In the COENAGRIIDAE are found only the two primary antenodal nervures, but in the whole of the AMPHIPTERYGIDAE these are reinforced by a varying number of secondary antenodals, some of which have the costal and subcostal halves in strict alignment, three in the case of *Amphipteryx* and as many as four to seven in the case of *Devadatta*. A continuation of this process, until the whole of the secondary antenodals show alignment, brings the structure of the wing to the condition existing in the most recent of the AGRIIDAE.

The six genera comprising the family, if one include the fossil genus *Steleopteron*, are distributed over five continents, two from S. Asia, one from Australia, one from W. Africa, one from S. America and one from the Upper Jurassic of Europe. This extremely disconnected distribution, taken in conjunction with the evident relationship of the Jurassic genus, shows that the family is a very archaic one.

Amphipteryx Selys.

This genus, a neotropical one, is known from a single species only, *A. agrioides* Selys. Among a small series in the British Museum collection, I have found one specimen in which the median space is traversed, in three out of its four wings, by a single nervure. So far as I know, this is the earliest occurrence of such nervures in the whole Order Odonata and is of great significance phylogenetically, since in the adjacent family HELIOCHARITIDAE, the median nervures are found cropping up again in the genus *Heliocharis*, and they are finally present in the whole of the American entogenic AGRIIDAE. Thus there appears to be strong evidence of the descent of these American genera of the AGRIIDAE from the AMPHIPTERYGIDAE through the HELIOCHARITIDAE. It must be understood that the presence, in all, of median nervures, is not the sole evidence for such a theory, but is further supported by that of the antenodal complex found in *Devadatta*, belonging to the same family AMPHIPTERYGIDAE.

Devadatta Kirby (= *Tetraneura* Selys, nom. preoc.) (fig. 1).

This genus is known from three species, *D. argyroides* Selys, *D. multinervosa* Fraser, and *D. podolestoides* Laidlaw. Whilst studying the venation of these three species recently, I was surprised to see a feature which appears to have escaped the notice of all authors, including myself, who have dealt with the genus. This is the fact that the venation of the fore-wings in *D. argyroides* and *D. podolestoides* differs markedly from that of the hind-wings, whilst that of *D. multinervosa* is similar in both wings and to that of the hind-wings in the other two species. Now in this last species, one finds as many as six or seven antenodal nervures of which the costal and subcostal halves coincide, whereas in the other two species only four are found to coincide. In the COENAGRIIDAE, only the two primary antenodals coincide, so that this increase to four, in the case of the two species of *Devadatta*, *D. argyroides* and *D. podolestoides*, must be interpreted as the first evidence of the evolutionary passage from the Coenagrioid to the Agrioid condition, in which all the antenodals are found to coincide. The further increase of the antenodals to seven, in the case of *D. multinervosa*, clearly shows that it is more highly developed than the two other species. Further evidence to this effect is afforded by the post-costal nervures, which may be absent altogether or more usually number from two to four in *D. argyroides* and *D. podolestoides*, whereas in *D. multinervosa* they normally number five and may be increased to as many as seven. In the AGRIIDAE they are always extremely numerous. Having established the higher development of *D. multinervosa*, I may now revert to the dissimilarity in the venation of the fore- and hind-wings found in the other two species (fig. 1). In the fore-wings, the nervures Riⁱⁱⁱ,

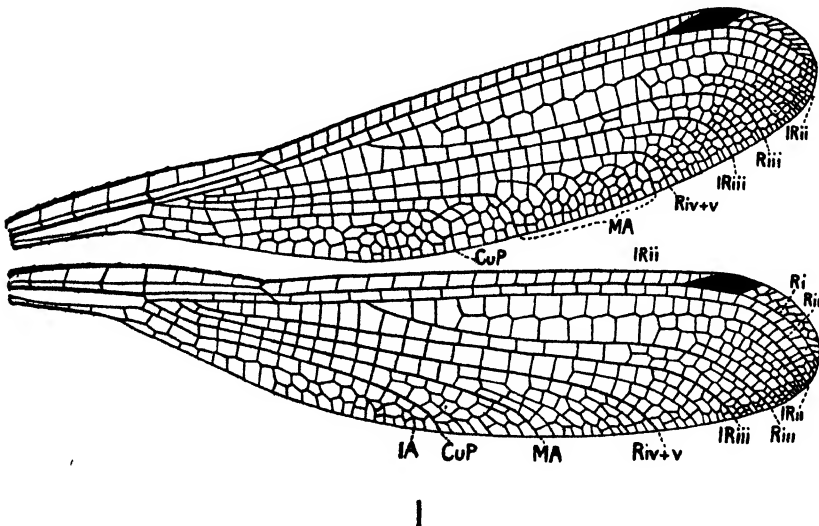


FIG. 1.—Wings of *Devadatta argyroides* (Selys). Note the marked variation between the venation of fore- and hind-wings.

IRⁱⁱⁱ, Riv + v, MA, CuP and IA, at their terminations, all take a sharp curve downwards towards the hind margin of wing, and, in the case of the two last nervures, break up into a series of arched pectinations, the fine curls of which may be likened to "breaking waves." In the hind-wings, these same nervures run with a gradual and rather flattened convexity to reach the hind margin.

This latter condition is common to both fore- and hind-wings of *D. multinervosa*, and is the chief distinguishing feature separating the species. Now since *D. multinervosa* has been shown to be more highly developed than the other two species, it is clear that the condition found in the hind-wings of all indicates a higher development than that found in the fore-wing. In the Anisoptera, the development of the hind-wing is always a stage in front of that of the fore-wing, and I believe that, in most cases, especially in the higher forms, the same can be said of the Zygoptera. Certainly it is the case here, for a comparison of the type of venation exhibited in the fore-wing must be looked for in *Podopteryx* of the MEGAPODAGRINIDAE, from the stem of which the family AMPHIPTERYGIDAE has most certainly arisen, whilst the type of venation found in the hind-wing more resembles that generally found in the AGRINIDAE. *Devadatta* is purely oriental.

Pentaplebia Förster.

This genus is unknown to me save by description. The number of antenodals, five only, points to it being rather more archaic than the other genera belonging to the family. The genus is Ethiopian in distribution, and is known from one species only.

Diphlebia Selys.

This genus, which is confined to Australia, is known from four species; its chief interest, in so far as this paper is concerned, lies in the close similarity of both imago and larva to those of the genus, *Philoganga*, discussed next. The wings in both genera are very long and very narrow and the same may be said of the pterostigma; the body is remarkably robust; the resting habit, with widespread wings like a *Gomphus*, so unusual in the suborder Zygoptera, is common to *Diphlebia* and *Philoganga*. In regard to the larvae, one finds a much closer resemblance; both inhabit torrential mountain streams, clinging to the undersides of stones or rocks or hiding up in clefts of rocks. Their morphology is so closely similar that they could easily be confounded with one another. In short, on the evidence afforded by the close resemblance between the two larvae, one would not hesitate to place them in the same family. The antenodal complex is closely similar to that of *Devadatta* and *Amphipteryx*, and *Diphlebia* is undoubtedly more closely allied to these than to *Philoganga*. It is unfortunate that the larvae of the two first genera have not so far been discovered.

Philoganga Kirby (= *Anisoneura* Selys, nom. preoc.) (fig. 2).

This genus is known from three species, all oriental in distribution. Its exact position in the Odonata has long been a puzzle to students of the Order, but the discovery of its larva, described below and closely resembling that of *Diphlebia*, no longer leaves doubt as to its correct place in the family AMPHIPTERYGIDAE. Although the nodal index is much higher than in all the other genera comprising the family, only the two primaries are found to coincide: moreover the recession of the nervures IR_{iii} and R_{iv} + v has not proceeded so far as in these genera, so that it must be regarded as the most archaic in the family. The description of the larva of *Philoganga montana* (Selys) follows:

Larva: Total length from 30 to 40 mm.

Colour dark brown with some pale yellow markings on the distal five segments of abdomen in the form of sagittate middorsal basal spots and moderately broad lateral

stripes. The whole body, including head, greatly flattened to conform to the insect's habit of hiding beneath stones or in the clefts of rocks. Head about 5.0 mm. long and some 6.0 mm. broad; eyes rounded, widely separated and fringed laterally and just below, by a number of sharp spines, three of which are longer than the rest and gradually decrease in length from behind forwards. These project prominently from beneath the eyes just as they do in *Diphlebia*. Frontal shelf well developed; labium of great size, 6.5 mm. long and 5 mm. broad anteriorly, very flat, extending back so as to cover most of the prothorax; mentum scutellate, finely serrate laterally, projecting forward anteriorly and with a fine

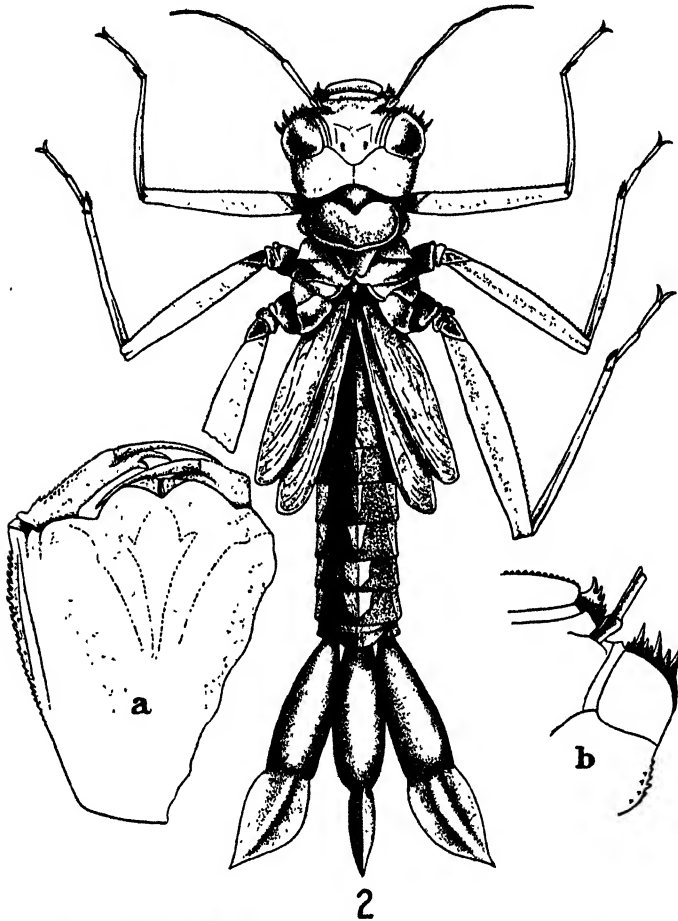


FIG. 2.—Larva of *Philoganga montana* (Selys). *a*. Labial mask seen from inner side. *b*. Side of head enlarged to show spines.

median cleft; no setae present; lateral lobes robust, coated with fine spines on the outer side and with one more robust than the others at the base; ending in a long, slender movable hook and three shorter, stouter ones, the medial one of which is much the longest. Thorax robust, broad and flattened; abdomen very short as compared with the rest of the body, slightly carinated dorsally. Legs robust, rather long, markedly flattened, especially the femora and held splayed out from the body to conform to the usual resting position on a flattened surface, devoid of hairs but the femora finely spined anteriorly. Caudal gills :

lateral pair 6.0 mm. long, median one-half that length (but somewhat shrivelled and probably longer during life), lateral pair saccoid or triquetral in proximal two thirds, broadly spatulate and acuminate for the distal third; median gill of very similar shape.

Habitat: ASSAM: Shillong. Found beneath stones in a small mountain stream full of boulders. The imago was frequently found resting, with wings spread flat out, on foliage beside this stream. The venation was fully developed in the larval wings and easily readable, especially in the distal three fourths; it was in this way that the larva was identified. It will be seen by a comparison with the description and figures given for *Diphlebia* by Tillyard, that this larva resembles that of the latter to a remarkable degree, so as to leave no room for doubt about their relationship. The failure of the secondary antenodals to coincide in the imago seems to indicate that its development along lines leading to an Agrioid type has ceased and that it is becoming specialised in a different direction.

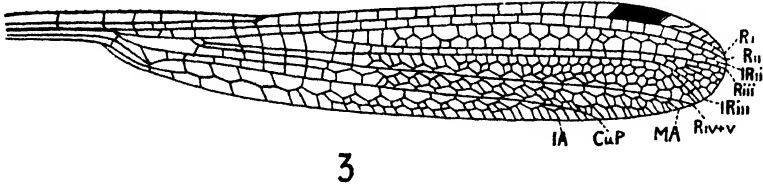


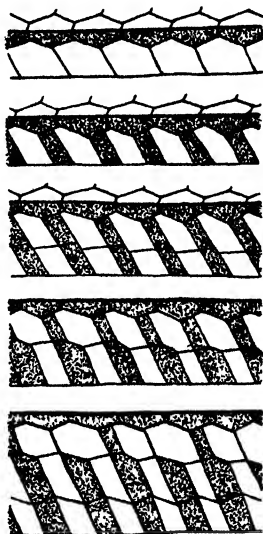
FIG. 3.—Wing of *Steleopteron deichmülleri* Handl. Upper Jurassic, Solenhofen, Bavaria.

Steleopteron Handlirsch (figs. 3 & 4).

This genus of the AMPHIPTERYGIDAE was founded by Handlirsch to accommodate a single species from the Upper Jurassic of Solenhofen, Bavaria, *S. deichmülleri*. Handlirsch was in doubt as to its correct position in the Odonata, and so erected a new family to contain it, the STELEOPTERIDAE. He noticed the mingled Coenagrioid and Agrioid characters present in the wing venation, and evidently observed the nature of the antenodal complex, for he compared the wing with *Anisoneura* (*Philoganga*) and *Tetraneura* (*Devadatta*). The figure of the wing given in Handlirsch's Atlas, Pl. 47, f. 20, is very poor, and parts of it are difficult to interpret. Through the courtesy of the authorities of the Vienna Natural History Museum, I have been able to make a re-examination and a fresh figure of this fossil which was loaned to me for that purpose. Apart from the acute character of the discoidal cell in both fore- and hind-wings and a somewhat aberrant venation, there is no other special reason why this species should not be placed in the family AMPHIPTERYGIDAE; thus the name STELEOPTERIDAE becomes a synonym of the former.

This fossil wing is of great interest: it not only displays the wave-like, curling ends of the longitudinal nervures but shows in what way they were evolved; the terminations of MA and IA should be compared with those in the fore-wing of *Devadatta*. The formation is derived firstly from polygonal cells which later become bisected by a diagonal line passing from the middle of one side to that of the side opposite, as is well depicted in the space between MA and CuP; later still, these polygons are again bisected by a sector passing at right angles to the first diagonal but not in the same straight line, thus cutting each polygon into four separate ones. Each set is staggered, and by the addition of another such polygon beneath it the wavy pectination of the nervures is finally evolved.

In *S. deichmülleri* the downward sweep of IRiii is already accomplished as in *Devadatta*; a broadening of the wing would see the successive nervures following suit. The antenodal complex is almost identical to that of *Amphipteryx*; the discoidal cell, as has already been mentioned, is very acute distally and is similar in shape in all wings; its base shows no closing nervure in the fossil, but since the plane of the cell is set abruptly at an angle to that of the median space, and the line separating the two is quite straight, I have no doubt about such a nervure being present. Three wings, two of which are still attached to the thorax, are found in the fossil of *Steleopteron deichmülleri* and all exhibit practically identical venation. Thus the hind-wing, as well as the fore-wing, still preserves the wavy nature of the terminations of the longitudinal nervures, which has been lost in the hind-wings of *Devadatta argyroides* and *D. podolestoides*,



4

FIG. 4.—Diagrammatic figure showing how the pectinated, wave-like endings of the longitudinal nervures found in *Devadatta argyroides* and *podolestoides* fore-wings are evolved from simple polygonal cells. Note how all stages of this are exhibited in *Steleopteron deichmülleri* Handl. (fig. 3). Alternating cells are shown shaded to demonstrate their alternating concavity and convexity, as in the case of the nervures.

and in all wings of *Devadatta multinervosa*, as well as in all species of the remaining genera of the family AMPHIPTERYGIDAE. Only a single row of cells is present distal to the pterostigma in *S. deichmülleri*, similar to the condition found in *Diphlebia* and *Philoganga*, but differing from *Devadatta* and *Amphipteryx*. Such differences are purely specific but may be becoming generic. (In this connection, it is convenient to correct a statement made by the late Dr. Tillyard in his paper No. 3, Mesozoic Insects of Queensland. Here, a propos the venation of the fossil species *Perissophlebia multiseriata* Till., he says, "As a general rule, both for recent and fossil Odonata, the space between C and R, distal to the pterostigma, contains only 1 row of cells." He then quotes *Petrothemis* Handl., and the AESCHNIDIIDAE as exceptions to this rule, and goes on to say that

Perissophlebia stands on this character, as the most densely veined of all known Odonata. This is not entirely correct, as two or more rows of cells between C and R are found in many of the Zygoptera. In *Thaumatoneura* there are three to four rows between C and R, and as many as five rows between R and Rii, a number greater than in *Perissophlebia*. In many species of *Mnais*, *Thore*, *Sapho*, and *Echo*, as well as in *Podopteryx*, two rows between C and R are normal. The shape of the pterostigma in *Perissophlebia* suggests that of *Thaumatoneura* and *Podopteryx*, so that it seems much more probable, in spite of the great size of the species, that it belongs somewhere near the MEGAPODAGRIIDAE or AMPHIPTERYGIDAE.)

Summary : In this paper, the family AMPHIPTERYGIDAE has been enlarged to include the recent genus *Philoganga* and the Jurassic *Steleopteron*; the larva of *Philoganga montana* Selys is described and its close resemblance to that of *Diphlebia* pointed out. A hitherto unnoticed variation between the fore- and hind-wings of *Devadatta argyroides* and *D. podolestoides* is figured and described and contrasted with the venation of the third species *D. multinervosa*, in which it is similar in all wings. The phylogenetic significance of this is explained by comparing their venation with that of *Steleopteron deichmülleri* Handl., of which a figure, made from a re-examination of the type, has been prepared. The evolutionary progress from simple polygonal cells found in this last species to the ordered arrangement found in *Devadatta argyroides* is explained. Finally a short note is given on the probable relationship of *Perissophlebia multiseriata* Till. to the MEGAPODAGRIIDAE or AMPHIPTERYGIDAE.

My thanks are due to the authorities of the Natural History Museum, Vienna, for their courtesy in lending me the fossil type specimen of *Steleopteron deichmülleri* Handl., without which much of this paper could not have been written.

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A NEW MOTH OF THE FAMILY NOTODONTIDAE (LEPIDOPTERA)

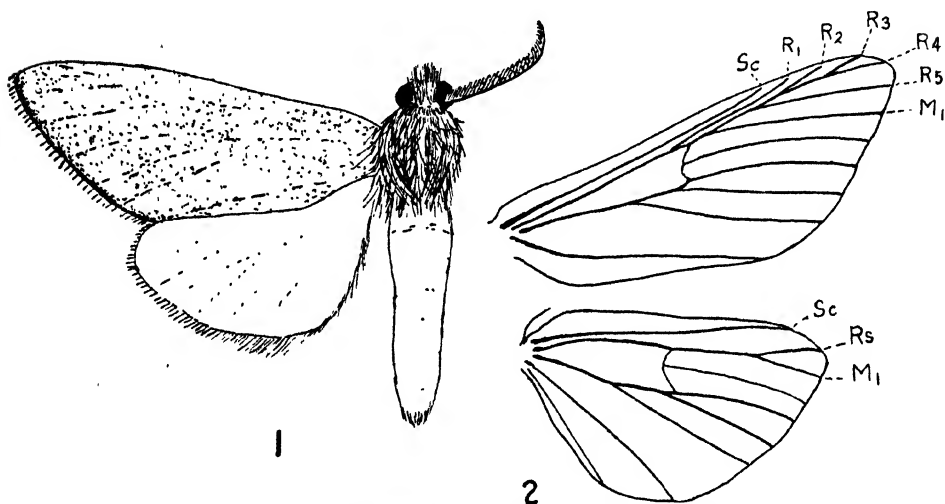
By W. H. T. TAMS, F.R.E.S.

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Sumeria gen. n.

Antenna with long pectinations to near apex. Palpus upcurved, closely appressed to frons. Fore-wing with veins R₂, R₃, R₄, R₅ and M₁ stalked; hind-wing with vein Sc free and veins R_s and M₁ proximally united for more than half their length. Male genital armature with tergite X undivided, valve divided; 8th sternite almost simple.

Type of the genus: *Sumeria dipotamica* sp. n.



FIGS. 1-2.—*Sumeria dipotamica* Tams, gen. et sp. n. ♂, venation of wings.

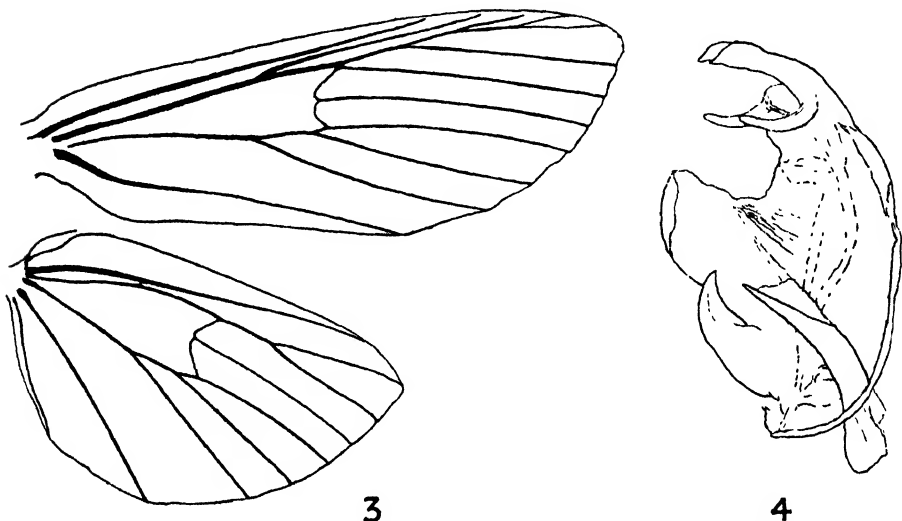
Sumeria dipotamica sp. n.

♂. Antenna honey yellow. Palpus light buff. Head light buff. Thorax avellaneous. Pectus and legs light buff shaded with avellaneous. Abdomen light buff. Fore-wing avellaneous, termen darker (buffy brown), fringe cartridge buff. Hind-wing cartridge buff. Underside of fore-wing pinkish buff, of hind-wing cartridge buff. Expanse: 40-44 mm.

Holotype ♂ and 2 paratype ♂♂: PERSIAN GULF: Fao. 2 paratype ♂♂: MESOPOTAMIA: Basrah, xi.1918 (*P. J. Barraud*). Paratype ♂: IRAQ: Provinz Arbil, x.1935 (*Général Grosse-Prague*). Paratype ♂: IRAN: Fars, Strasse Kazeroun-Bouchir, Tchouroum (circa 1000 m.) 6.iv.1937 (coll. *W. Brandt*). The two specimens last mentioned were sent over from the Paris Museum by Monsieur Ch. Boursin, and have been returned to their owners.

PROC. R. ENT. SOC. LOND. (B) 7. PT. 7. (JULY 1938.)

At first sight this genus appears to be related to *Turnaca* Walker (type *T. acuta* Walker), in which vein M1 of the fore-wing is not stalked with the radials,



FIGS. 3-4.—3. *Turnaca acuta* Walker, venation of wings; 4. *Sumeria dipotamica*, ♂ genitalia (one valve removed).

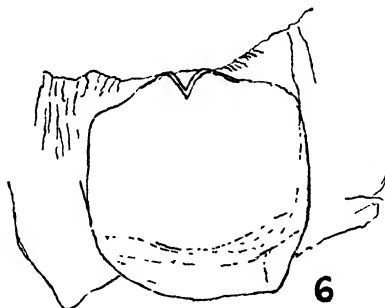
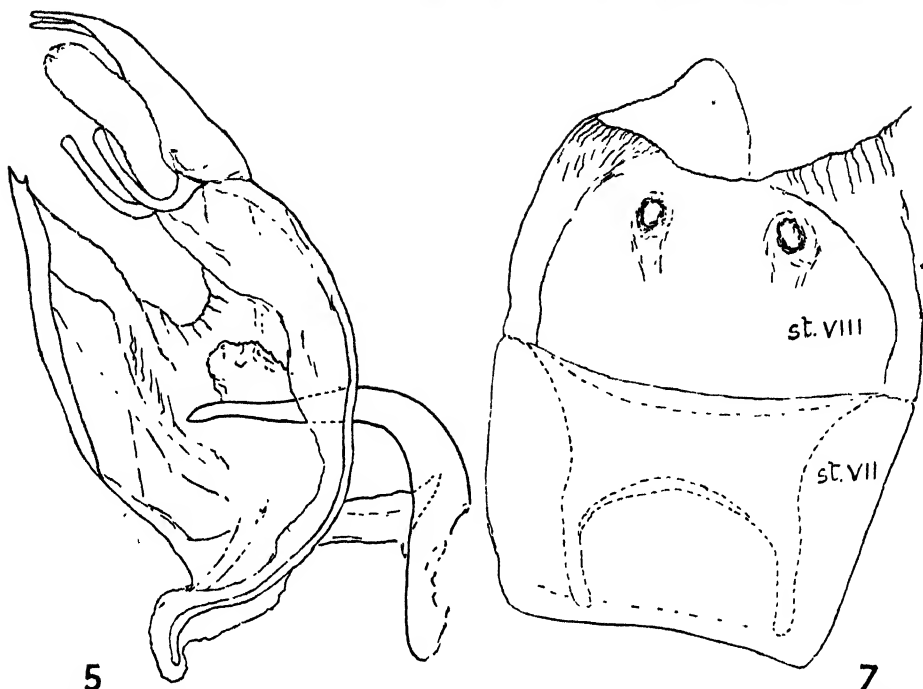


FIG. 6.—*Sumeria dipotamica*, ♂, 8th sternite.

vein Sc of the hind-wing is joined to the middle of the upper margin of the cell by a slight bar, veins Rs and M1 of the hind-wing have a much shorter stalk,



FIGS. 5, 7.—5. *Turnaca acuta* Walker, ♂ genitalia (one valve removed); 7. ♂, 8th sternite.

the 8th sternite is considerably modified, and the male genital armature has a divided tergite X and a simple valve.

(Colours from Ridgway, *Color Standards and Nomenclature*, 1912.)

NEW SPECIES OF JAVANESE STAPHYLINIDAE (COL.) COLLECTED BY MR. C. J. LOUWERENS

By MALCOLM CAMERON, M.B., R.N., F.R.E.S.

THE types of unique specimens described herewith are in my collection, para-types in the Louwerens collection. I have examined the types of all species used for comparison except *Holosus brevipennis* Fauv., *Megalopsidia uniformis* Bernh. and *Lathrobium ferreum* Fauv.

OXYTELINAE.

Holosus louwerensi sp. n.

Shining black, antennae and legs reddish-brown, the last segment of the former reddish. Length 3.5 mm.

PROC. R. ENT. SOC. LOND. (B) 7. PT. 7. (JULY 1938.)

In size and build scarcely differing from *brevipennis* Fauv. but with the antennae a little longer, the penultimate segments less transverse; head as closely but more deeply punctured and with a similar fine transverse wavy ground sculpture; thorax with the sides more sinuate behind and with large fovea adjacent to the posterior angles, the base in the middle distinctly bi-impressed, the impressions separated by a narrow, slightly raised shining line, the puncturation and ground sculpture as in *brevipennis*. Elytra a little longer (6:4) than the thorax, as closely but much less finely punctured than in *brevipennis*, the punctures here and there longitudinally confluent. Abdomen with the lateral striae distinctly less fine and more oblique, the few punctures not so fine as in *brevipennis*.

E. JAVA : Res. Kediri, Slawe. Unique.

Trogophloeus (Troginus) louwerensi sp. n.

Moderately shining, black, the elytra pitchy black. Antennae and legs reddish-yellow, the former a little infusate towards the apex. Length 2 mm.

Larger and distinctly more robust than *exiguus* Er., the antennae stouter, the elytra shorter. Subcylindrical, head scarcely narrower than the thorax, the eyes rather large; closely, obsoletely punctured, the punctures confused with the ground sculpture. Antennae with the 3rd segment shorter than the 2nd, 4th about as long as broad, 5th similar but stouter, 6th a little narrower than the 5th as long as broad, 7th to 10th gradually more transverse. Thorax transverse (3.3:2.5), convex, the sides gently rounded in front, straighter and distinctly retracted behind, at the middle of the base with two very small and obsolete impressions, closely finely but distinctly punctured, finely coriaceous. Elytra broader and slightly longer than the thorax, as closely but less finely punctured, finely coriaceous. Abdomen finely coriaceous, practically impunctate, very finely and sparingly pubescent.

E. JAVA : Toeloengagoeng.

Oxytelus (Tanyraerus) kedirianus sp. n.

Black or pitchy black, the elytra yellow, shining; head greasy lustrous, thorax and abdomen shining. Antennae black, the first four segments and legs reddish-yellow. Length 3-3.75 mm.

♂. Very near *lucidulus* Cam. but with much less shining head and scarcely transverse penultimate segments of the antennae etc. Head a little broader than the thorax, widened behind, the eyes moderate, not quite so long as the temples, clypeal region depressed, the frontal margin truncate, its anterior angles a little prominent and everted, strongly coriaceous and impunctate; neck separated by a fine arcuate sulcus obsolete in the middle; the whole surface except the neck coriaceous, the vertex finely, sparingly striate and practically impunctate, the post-ocular region finely and closely transversely striate and impunctate; neck without ground sculpture but with a few fine punctures; mandibles prominent, strongly curved. Antennae rather long, the 5th segment narrower than the 6th, 6th to 10th about as long as broad, the 11th as long as the 9th and 10th together. Thorax transverse (6:4), trapezoidal, the posterior angles rounded, the disc deeply and narrowly trisulcate, towards the sides with an impression which is rather coarsely punctate-striate; the disc with some minute punctures; ground sculpture absent. Elytra slightly longer than the thorax, finely, rather closely punctured and without striae or ground sculpture. Abdomen practically impunctate, coriaceous.

♀. Head smaller, narrower than the thorax, not dilated behind, the eyes larger, longer than the post-ocular region; frontal margin gently rounded, disc with a few punctures, not striate, coriaceous; thorax narrower (5:4); in other respects similar to the ♂.

♂. 6th ventral segment with a median subtriangular lobe, furnished with a tuft of

yellow setae at the apex, on each side broadly arcuately emarginate; 7th produced as a triangular plate with rounded apex.

E. JAVA : Res. Kediri, Pandan.

Osorius kedirianus sp. n.

Very near *fraterculus* Cam. but smaller (4.75 mm.) and narrower, the frontal margin gently rounded and furnished with 7 or 8 small blunt teeth, but the declivous part of the front is practically without sculpture in the middle, only a few minute scattered punctures being visible; the median impunctate area between the eyes is broader and on each side of it there are a few flat more or less confluent impressions; thorax less finely and more closely punctured, elytra more deeply and more closely punctured, abdomen a little more closely punctured than in that species.

E. JAVA : Res. Kediri, Pandan Aroem. Unique.

Bledius (Pucerus) louwerensi sp. n.

Head rather dull, black, the rest more shining, the thorax black, the elytra pitchy brown. Antennae reddish-yellow, the penultimate segments a little infusate. Legs yellow. Length 3 mm.

Size, build and antennal structure of *gracilicornis* Kr. but with darker elytra, more superficial puncturation of thorax and weaker ground sculpture and with more finely punctured elytra. Head impunctate, rather dull, coriaceous, the clypeus with two little teeth. Antennae with very long 1st segment, 2nd to 4th longer than broad, decreasing in length, 5th as long as broad, 6th to 10th slightly transverse. Thorax slightly transverse, the sides parallel for the anterior two-thirds, then retracted and rounded with the base, along the middle with a narrow sulcus, rather closely, finely and superficially punctured, finely coriaceous. Elytra half as long again as the thorax, closely, rather finely and superficially punctured. Abdomen practically impunctate.

E. JAVA : Res. Kediri, Pandan Aroem, Samberbajem.

MEGALOPSIDIINAE.

Megalopsidia nigerrimus sp. n.

Very black, shining. Antennae reddish-yellow, the club dark. Legs reddish-yellow, the femora paler. Length 2 mm.

This species must be very near *uniformis* Bernh. from the Philippines, but differs in the sculpture of the thorax and elytra. Head very broad, much broader than the elytra, coarsely, moderately closely punctured. Antennae short, slender with large 3-segmented club. Thorax transverse (5.3 : 4.3), widest before the middle, the sides rather strongly retracted behind, with three small but distinct teeth between the anterior and posterior angles; just before the middle with a transverse arcuate, closely and strongly punctured sulcus, the surface in front of this closely and yet more coarsely punctured; along the posterior margin with a row of closely placed, moderate punctures, in the middle with a keel extending between this row and the sulcus, the punctures on each side of the keel very large, towards the sides smaller and less close. Elytra as long as but broader than the thorax, strongly transverse, the humeral angle prominent forming a smooth boss which is produced backwards as a narrow keel; the base on each side with one or two punctures, otherwise smooth, elsewhere with very large punctures. Abdomen conical, with a few punctures in the impressions and on the 7th segment and without oblique striae.

E. JAVA : Res. Kediri, Besoeki. Unique.

STENINAE.

Stenus (Hypostenus) cinctiventris sp. n.

Shining, black, the elytra each with a large round yellow marking almost reaching the sutural and lateral margins, the 3rd and 4th abdominal segments red. Antennae blackish, the first four segments and legs yellow. Length 5.5 mm.

Very near *pulcher* Motsch. but the antennae are darker towards the apex, the puncturation of the head finer, thorax a little shorter, not quite so coarsely punctured, elytra also rather less coarsely punctured, the yellow marking round extending nearer the suture, but on the other hand not so close to the humeral angle; the abdomen has the 3rd and 4th segments red and the puncturation though equally sparing is finer, finally the ground sculpture on the head, thorax and abdomen is more evident and the elytra also are distinctly coriaceous, whereas in *pulcher* ground sculpture is absent.

♂. Unknown.

E. JAVA : Res. Kediri, Djatiwekas. Unique.

PAEDERINAE.

Lathrobium (s.str.) quadriceps sp. n.

Shining, reddish-brown, the head sometimes darker; the elytra red with the postero-external region blackish. Antennae and legs yellowish-red. Length 6.5-7 mm.

In colour and square head resembling *ferreum* Fauv. but much smaller etc. Head scarcely broader than long, quadrate, as broad as the thorax, the temples parallel, the posterior angles briefly rounded, the eyes small; middle of the disc impunctate, elsewhere with moderately close, rather small umbilicate punctures and here and there with a few much smaller ones, the post-ocular region only with a fine ground sculpture. Antennae with all the segments longer than broad, oval, narrowed at the base, gradually decreasing in length. Thorax very slightly longer than broad, the sides straight and retracted backwards, the posterior angles rounded, along the middle with rather broad impunctate space, elsewhere with larger and smaller umbilicate punctures irregularly distributed: ground sculpture absent. Elytra longer (5:4) than the thorax, serially punctured. Abdomen extremely finely, sparingly punctured, finely coriaceous. Pubescence sparing.

♂. 6th ventral segment with narrow arcuate emargination.

E. JAVA : Res. Kediri, Besoeki. Toeloengagoeng.

Belonuchus kedirianus sp. n.

Shining, black, the elytra red. Antennae black, the first two segments and legs red. Length 11.5 mm.

In the large size and broad build resembling *bakeri* Bernh. and with similarly constructed antennae, the head, however, has more numerous punctures, the elytra are more finely punctured, the abdomen, however, scarcely differs in sculpture from that species. Head quadrate, broader than the thorax, very slightly broader than long, at the posterior angle with a denticle, the front with four small punctures placed trapezoidally, behind these on each side with a group of 5 or 6 punctures and on each side of the disc with 3 others in an oblique row, before the base with the usual transverse row of punctures; ground sculpture distinct. Thorax with small emargination behind the anterior angles and with a discal row of 6 or 7 small punctures, the ground sculpture as on the head. Elytra a fourth longer than the thorax with moderately close and moderately fine puncturation. Abdomen

much more coarsely and deeply punctured than the elytra as in *bakeri* and with a triangular smooth space in the middle of each segment.

♂. Unknown.

E. JAVA : Res. Kediri, Toempoeck. Unique.

***Belonuchus associatus* sp. n.**

Shining black, the elytra yellowish-red. Antennae black, the first two segments and legs yellowish-red. Length 9.5 mm.

***B. associatus* var. *morosus* var. n.**

Elytra black, base of antennae and legs pitchy black. Smaller than *kedirianus*, the antennae a little shorter with more transverse penultimate segments, head shorter and more transverse, distinctly broader than long (7.3 : 5.3), without group of punctures behind the four frontal ones, but only with two placed obliquely on each side of the disc; thorax with dorsal row of four or five punctures; elytra a fourth longer than broad, the puncturation as in *kedirianus*, the abdomen more finely, less deeply and more sparingly punctured than in that species. Every gradation of colour is found between the type form and the variety.

E. JAVA : Res. Kediri, Toempoeck.

STAPHYLININAE.

***Belonuchus javanus* sp. n.**

Shining, black, antennae black, the 1st and 2nd segments reddish, the 11th orange-red. Legs yellowish-brown. Length 8-9 mm.

In size, build and antennal structure scarcely differing from *rufoniger* Fauv. The puncturation of the head is similar but with an additional puncture on each side before the middle of the base, the sculpture of the thorax is as in that species, the elytra, however, are less finely, more deeply, and the abdomen less finely and less closely punctured and with an extensive area in the middle of each segment impunctate. The head and thorax are without trace of the iridescence seen in *rufoniger* in certain lights.

E. JAVA : Res. Kediri : Besoeeki, Samberbajem.

***Staphylinus (Platydracus) auroaeneus* sp. n.**

Head black, greenish-brassy between the eyes; thorax greenish-brassy, the side margins narrowly yellowish; scutellum black, velvety and with a spot of yellow pubescence; elytra blackish, the shoulders and reflexed margin reddish-yellow, variegated with greenish-golden pubescence. Abdomen blackish, the first five segments each with a patch of golden pubescence along the middle and black bifariate, the sides closely yellow pubescent. Antennae black, the first two segments and legs yellow, the tarsi reddish. Length 12 mm.

Head transverse, widest behind, the posterior angles rather broadly rounded, the eyes longer than the temples; in the middle between the eyes with a short shining line, otherwise closely covered with moderate umbilicate punctures and long, close golden pubescence. Penultimate segments of antennae fully twice as broad as long. Thorax as long as broad, before the scutellum with a short smooth space, the sculpture and pubescence as on the head. Elytra as long as the thorax, strongly coriaceous, mottled with patches of short yellow pubescence and also with longer golden hairs.

E. JAVA : Res. Kediri, Pandan Aroem. Unique.

Staphylinus (Platydracus) contiguus sp. n.

Head and thorax bronze-black; elytra reddish-brown; abdomen brown, the posterior margins of the segments obscurely reddish, the first three segments obscurely bifariate, the first four with small ill-defined patches of golden pubescence in the middle and at the sides. Antennae with the 1st and 2nd segments red, the 8th to 11th reddish, the rest black. Legs yellow. Length 14 mm.

In build and colour very like *chalceus* Bernh. but the head is less transverse; the post-ocular region slightly but distinctly widened, longer than in *chalceus* but shorter than the eye, the sculpture not quite so coarse; thorax formed as in *chalceus* but less brassy, the sculpture rather finer, the pubescence brown; elytra as in *chalceus*; abdomen with the median golden pubescence less distinct, more sparing, the long pubescence reddish-brown as on the fore-parts, not golden as in *chalceus*.

E. JAVA : Res. Kediri, Pandan Aroem. Unique.

Ontholestes elegans sp. n.

Head black, the anterior border yellowish-red, closely covered with short golden pubescence; thorax black, the anterior angles, sides and base yellowish-red, closely covered with short golden pubescence and spots of silvery hairs, one at the anterior angle, another about the middle of the side, one on each side of the disc and one in the middle near the base; scutellum black, velvety; elytra black, the anterior angles, reflexed and posterior margins yellowish-red, closely covered with short golden pubescence variegated with tufts of silvery and black hairs; abdomen black, the posterior margins of the first two and last segments broadly yellowish-red, the base of the first two segments each with a black velvety spot at the base on each side of the middle, the first three segments each with a median and lateral spot of golden hairs; 5th segment with transverse fascia of silvery pubescence at the base; besides these with numerous long golden and black hairs. Antennae yellowish-red. Legs yellow, the femora with a black marking about the middle, the anterior and middle tibiae blackish externally. Length 12 mm.

Very similar to *marmoratus* Er. in the colour of the fore-parts and pubescence, but more brightly coloured, the head broader, distinctly broader than the thorax, the sculpture a little coarser. Antennae longer and thinner, 3rd to 5th segments distinctly longer than broad, the following serrate, scarcely transverse. Thorax as in *marmoratus*, the sculpture as on the head. Elytra a little longer than in *marmoratus*, the variegated pattern very similar.

E. JAVA : Res. Kediri, Kalibamban. Unique.

Naddia kediriana sp. n.

Black, greasy lustrous, the abdomen more shining. Antennae black. Legs pitchy black, the apex of the tarsi reddish. Length 13-14 mm.

Colour and lustre of *assamensis* and very similar in build, but with the sculpture of the head and thorax finer, the latter with the sides more rounded and retracted behind, elytra less strongly sculptured, the fringe on the posterior margin shorter and more silvery, the patches of pubescence on the abdomen less marked and more silvery. In other respects like *assamensis*. From *vethi* Bernh. it is at once distinguished by the much finer sculpture and the longer elytra.

E. JAVA : Res. Kediri, Toempoeck, Toempa Meije, Kalibamban.

A NEW GENUS OF HECABOLINAE AND A NOTE ON THE GENUS *TELEBOLUS* MARSHALL (HYM., BRACONIDAE)

By G. E. J. NIXON, B.A., F.R.E.S.

(Imperial Institute of Entomology.)

THE material on which the present paper is based was submitted for identification by Mr. J. C. M. Gardner of the Forest Research Institute, Dehra Dun.

The types of the new species are in the British Museum.

HECABOLINAE.

Aivalykus gen. n.

Head of typical Doryctine and Hecaboline form and showing no distinctive structure. Antennae with at least 24 segments; scape very short, cup-shaped, slightly shorter than its apical width; pedicel only slightly shorter than the scape; funicle 1 sometimes markedly bent and, at any rate, slightly produced and swollen at extreme apex so that the joint between funicle 1 and 2 is different from that between the other funicular segments. Ocelli arranged in a triangle the base of which is longer than its sides. Maxillary palpi 5-, labial palpi 3-segmented. *Mesonotum* conspicuously truncated in front, falling away perpendicularly, or almost so, to the pronotum. Pronotum very short, lying far below the dorsal level of the mesonotum and projecting only very lightly beyond it. Course of the notauli indicated by some sort of sculpture. Mesopleura almost everywhere shining and unsculptured; sternauli either present as a straight narrow groove or absent. Legs: front tibiae with a row of spines; middle tibiae with at most 2-3 spines towards base; outer apical margin of the hind tibiae without a row of spines; hind coxae without a trace of a projection at base beneath. Wings more or less uniform in tint even if dusky; recurrent nervure interstitial or received into the 1st cubital cell; nervus parallelus exactly interstitial; submedian cell of fore-wings very narrow, of equal width throughout; no trace whatever of a 2nd transverse cubitus; 2nd cubital cell gradually widened from base to apex; nervulus present; 1st abscissa of the radius forming almost a right angle with the 2nd; lower basal cell of hind-wings virtually absent, only a short portion of the lower limiting nervure being defined. *Abdomen* of ♀ long and narrow in the genotype but less so in the second species. Petiole at least $1\frac{1}{2}$ times as long as its apical width. Ovipositor nearly as long as the body. Abdomen of genotype ♂ (the ♂ of the second species is not known) much modified and greatly lengthened.

Type of the genus :—*Aivalykus eclectes* sp. n.

In Szepligeti's key to the genera of the HECABOLINAE in the *Genera Insectorum*, this genus runs to *Monolexis* Förster. The type of this latter genus is given as *M. försteri* Marshall since Förster described no species. In *försteri*, as Marshall shows in his figure and description, the nervus parallelus is not interstitial but is received into the lower, external angle of the second discoidal cell.

Hecabolus Curtis as typified in the genotype *sulcatus* Curtis has a very different facies and has the middle tarsi much shorter (not a sound generic character in my opinion); this genus, like *Monolexis*, has the recurrent nervure received into the lower external angle of the second discoidal cell.

***Aivalykus eclectes* sp. n.**

♂♀. Dark brown; head paler, becoming brownish-yellow on face, temples and behind the eyes; smooth lateral margins of tergite (2, 3) in ♀ to sides of the sculptured area, and the lateral margins of the following tergites, brownish-yellow. Legs in small individuals of both sexes yellow throughout; in large ♀♀ a faint dusky spot appears on each side of the hind femora at apex; in ♂♂ these spots are more extensive and tend to coalesce to form a dark ring.

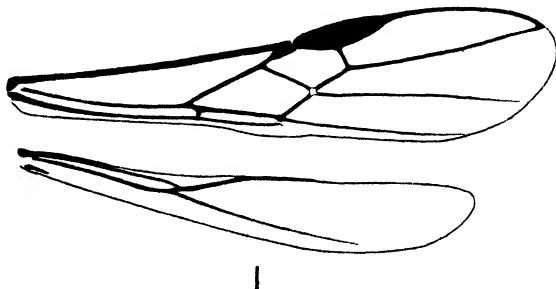
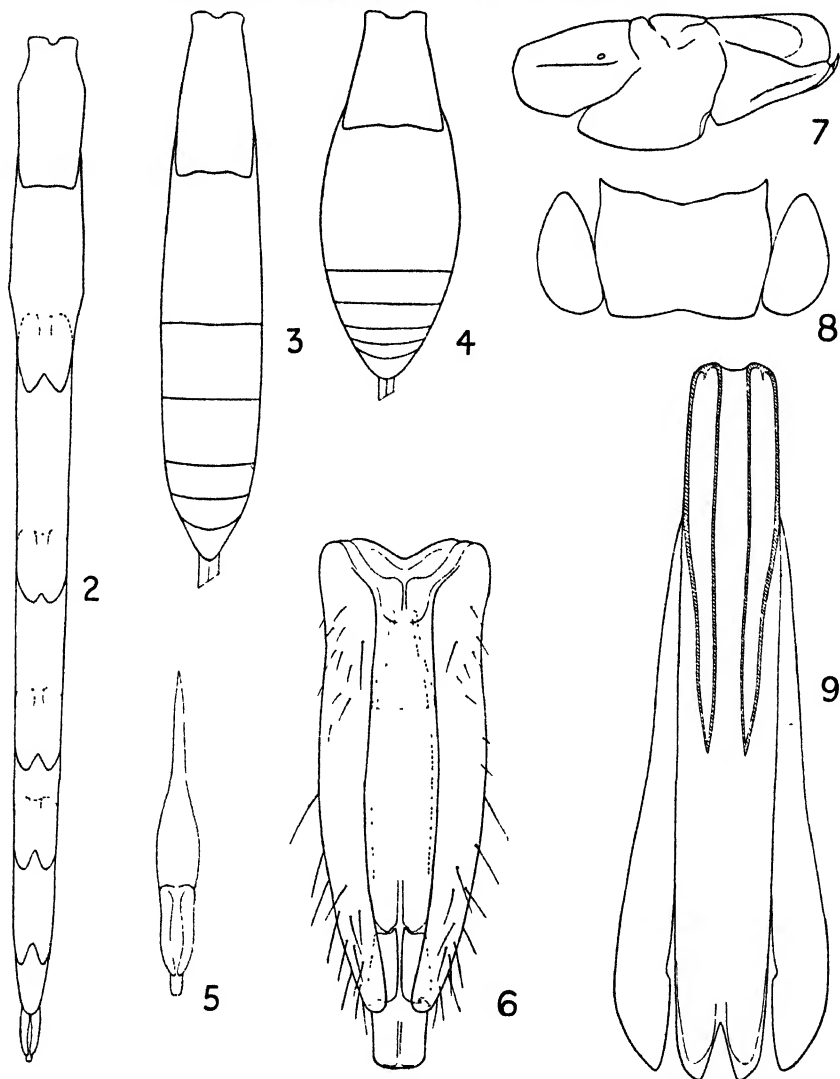


FIG. 1.—*Aivalykus eclectes* sp. n., wings of ♀.

♀. *Head* markedly transverse, clearly narrower behind the eyes than across them. Clypeus triangular, sharply delimited laterally; at its base continuous with a longitudinal, flattened elevation which extends almost to the antennal insertions. Face apart from the more or less smooth clypeus and central elevation shining and with indication of feeble, transverse, very irregular, striation. Vertex evenly transversely striated, the striae continuous and tending to be concentric at the upper eye-margin. Antennae with 30–35 segments; funicle 1 conspicuously bent, somewhat flattened on the inner curve; funicle 2 as long as 1. Head behind the eyes completely smooth. *Thorax*: Extreme apical margin of pronotum produced to form a short, transparent, membranous lamella (fig. 7); sides of pronotum without strong sculpture. Mesonotum with very short pale hairs restricted more or less to the course of the notauli; lobes virtually bare over their greater surface, shining and with a feeble, apparently transverse, surface sculpture; this sculpture is only a slight modification of the scaly-reticulate sculpture so prevalent on the lobes of the mesonotum in *Doryctine*, *Hecabolinae* and related genera. Notauli defined only as bands of irregular, rugose sculpture. Convex part of the mesopleura covered with fine short semi-decumbent hairs; sternauli represented by a straight narrow groove. Propodeum elongate, somewhat flattened; in profile more or less straight, having no well-defined posterior, declivous surface; along its middle extends a band of punctate-reticulate sculpture which widens behind; on each side of the sculptured band is a smooth area, about twice as long as wide; these smooth areas are margined laterally by a somewhat ill-defined carina; between this carina and the external carina (which lies outside the spiracles) is enclosed a narrow area which may be sculptured all over or smooth along the middle. Fore-wing (fig. 1): recurrent nervure sometimes interstitial, sometimes received into the extreme base of the 2nd cubital cell; 2nd abscissa of radius straight. Legs: middle tibiae with two spines just behind middle; segment 2 of hind tarsus nearly as long as 1, about 13:15; 3 nearly 1½ times as long as 5; middle tarsus long, slender, its 2nd segment only slightly shorter than 1st. *Abdomen* long, narrow, parallel-sided (fig. 3). Petiole more than twice as long as its apical width, about 9:4, coarsely reticulate-rugose all over; tergite (2, 3) deeply and evenly striated to within a quarter of apex; basally the striations tend to break up to form a sculpture resembling that of the petiole; no trace of a suture

between the fused 2nd and 3rd tergite; tergites beyond (2, 3) completely smooth. Ovipositor about as long as the body, very fine; its sheaths, on the other hand, unusually wide for the width of the ovipositor, being about 4 times as wide as this.



FIGS. 2-9.—2, *Aivalykus ectlectes* sp. n., abdomen of ♂; 3, abdomen of ♀; 4, *A. sperches* sp. n., abdomen of ♀; 5-9, *A. ectlectes* sp. n.: 5, genitalia of ♂ to show the much elongated basal structure; 6, genitalia of ♂; 7, thorax of ♀, lateral; 8, *simplex* form. n., tergite 6 of ♂ with epipleurae folded out; 9, tergite 6 of ♂ with epipleurae folded out.

♂. Antennae apparently with fewer segments than the ♀, 24-32. Hind femora tending to be swollen, especially in largest individuals in which, seen in profile, they are roundly angled at base. Hind-wing like that of the ♀. Abdomen: Petiole like that of the ♀ in shape and sculpture. Tergite (2, 3) with only a trace of sculpture at extreme base and then more especially towards the sides; this tergite (*i.e.* 2 plus 3) shows normal sclerotisation

restricted to a basal area which is roughly $\frac{1}{3}$ the length of the petiole. The abdomen is otherwise extraordinarily modified, tergites (2, 3)–6 being more or less parallel-sided, completely flattened and much longer than wide; in what I take to be the normal position of these tergites (fig. 2), they are telescoped one within the other by nearly half their length; they are provided with rod-like thickenings in the chitin of their basal half (fig. 9); further, tergites (2, 3)–6 are deeply emarginate at apex and thin and membranous along the middle. Genitalia, except for the basal structure, freely exposed beyond the apical tergite (figs. 5, 6).

Length: ♂, 5–7 mm. (tergites fully retracted); 1 ♂ with the tergites apparently fully exerted measures 9.5 mm. ♀, 4.5–5.4 mm. (without ovipositor).

UNITED PROVINCES: Dehra Dun, Jhajra: (N. C. Chatterjee), 6 ♀♀, 2 ♂♂, bred ii.–iii.1926 and 2 ♀♀, 2 ♂♂, bred v.–vi.1925 from wood of *Shorea robusta* Gaertner; (C. F. C. Beeson), 5 ♂♂, 5 ♀♀ *Holo- and Allotype*, bred ix.–x.1925 from wood of *Terminalia tomentosa* W. & A.; Golatappar: (C. F. C. B.), 3 ♂♂, 8 ♀♀, bred xi.1922 and iv.1923 from *Shorea robusta* Gaertn.; Thano R.: (C. F. C. B.), 5 ♂♂, 9 ♀♀, bred iv.–v.1923 from *Shorea robusta* Gaertn.; Lachiwala R.: (N. C. Chatterjee), 4 ♂♂, 8 ♀♀, bred viii.1922 from *Shorea robusta* Gaertn.; CENTRAL PROVINCES: Mandla, Banja R., Kanha: (D. J. Atkinson), 5 ♂♂, bred iv.1926 ex ?

I have examined a series of this species from the Philippines: Arorog, vii.1917 and Port Banga, xii.1914 (Büttcher) and can find no differences of sufficient magnitude to justify even a varietal name. On the whole, the elongate, smooth areas of the propodeum are less delimited in these examples and show a considerable amount of sculpture, especially basally.

Aivalykus eclectes f. *simplex* form. n.

While working through the material of *eclectes*, I came across 7 males in which the abdomen is completely unmodified. Apart from this very striking difference and a minor one in the shape of the genitalia (the cardo is less attenuated basally), these ♂♂ agree in every particular with the ♂ I associate with ♀ *eclectes*. In one particular they agree more with ♀ *eclectes* than do ♂ *eclectes*; tergite (2, 3), being unmodified, shows a sculpture, which both in degree of strength and in extent shows a more obvious similarity to that of the ♀ than does the modified tergite of ♂ *eclectes* (fig. 8).

These 7 males are smaller than average *eclectes* ♂, the head and thorax together being 1.3–1.4 mm., while head and thorax of typical *eclectes* are about 2 mm.

UNITED PROVINCES: Golatappar: (C. F. C. Beeson), xii.1922, 3 ♂♂ (one the type), iv.1923, 1 ♂, iv.1923, all ex *Shorea robusta* Gaertn.; Thano R.: (C. F. C. B.), iv.1923, 1 ♂ ex *Shorea robusta* G.; Jhajra: (C. F. C. B.), 2 ♂♂, bred x.–xi.1925 ex *Terminalia tomentosa* W. & A.

The appearance of these males seems to point to two conclusions: (1) that ♀ *eclectes*, as I interpret it, is a mixture of two species (a most exhaustive search has failed to reveal any differences), (2) that *eclectes* has two forms of the male, the more frequent and hence normal male being the modified form which I associate definitely with the female; the other, a small form, in which abdominal modification, for some reason, has not taken place.

Similarity of data, as well as similarity in all the somewhat distinctive features (form of pronotum, shape and sculpture of propodeum and long second segment of hind tarsus) which characterise typical *eclectes*, lead me to support the second conclusion.

Alvalykus sperches sp. n.

♀. This species is not very closely related to *eclectes* and certainly belongs to a different species-group, if not to a different genus. The most obvious differences between the two species lie in the shape of the abdomen and the sculpture of tergite (2, 3). The present species may be compared with *eclectes* as follows :—

Head of same shape but the eyes distinctly smaller. Striations of vertex much finer, fading out at temples; those in front show no tendency to be continuous with those behind. Face above the clypeus with a feebly delimited area which is widened below. Antennae with 25–26 segments; funicle 1 less flattened and less bow-shaped than in *eclectes*. *Thorax* : Extreme apical margin of pronotum not produced to form a membranous lamella. Mesonotum more shining, the ground sculpture weaker; posterior sunken area less rugose, the outstanding rugosities being two raised, convergent, broken ridges which mark the posterior limits of the notauli. Mesopleura without sternauli and virtually without hairs on the central, convex part. Propodeum shorter, the dorsal, virtually smooth areas not longer than wide; distribution of sculpture on the propodeum less characteristic, there being no conspicuous central band of sculpture; the central carina is margined on each side with irregular punctures; no trace of an areola, the costulae arising from the central carina at right angles to it; no trace of an internal lateral carina, only the external being present; this is usually sculptured to the same degree along each side. Second abscissa of the radius feebly curved; recurrent nervure received into the 1st cubital cell by a distance equal to about $\frac{1}{2}$ its own length. *Abdomen* much less elongate (fig. 4), not in the least parallel-sided, narrowly ovate. Petiole evenly widened to apex, longer than its apical width, about 4 : 3, smoothly striated all over; base of tergite (2, 3) with a variable amount of smooth striation which is sometimes almost absent. Ovipositor about as long as the body, its sheaths normal, not at all widened as in *eclectes*.

Length : ♀, about 4 mm. (without ovipositor).

UNITED PROVINCES : Lansdowne, Nauri, 2500 ft. : (*B. M. Bhatia*), 5 ♀♀ (one the type), bred 29–30.iii.1926 from wood of *Phoebe lanceolata* Nees.

Telebolus Marshall.

Telebolus Marshall, 1888, in André, *Spec. Hym. d'Eur.* 4 : 202.

The genotype, *T. corsicus* Marshall, is in the British Museum. Owing to its being gummed on to a card with the wings out-spread, it is not easy to make out the venation. Marshall says both 1st and 2nd transverse cubiti are absent as well as the 1st abscissa of the cubitus. Actually these three veins are present though faint; the radius is angled in two places to mark the origin of the two transverse cubiti. The genus has thus three cubital cells, and in my opinion is a typical member of the DORYCTINAE, not of the HECABOLINAE where Marshall placed it. It differs from typical *Doryctes* only in having the nervus parallelus interstitial. The hind coxae have a small projection at base.

NOTES ON CERATOPOGONIDAE (DIPTERA)

By Dr. J. W. S. MACFIE, F.R.E.S.

THE types of the new species of insects described below are in the British Museum.

The unit of measurement used is about $3.7\ \mu$.

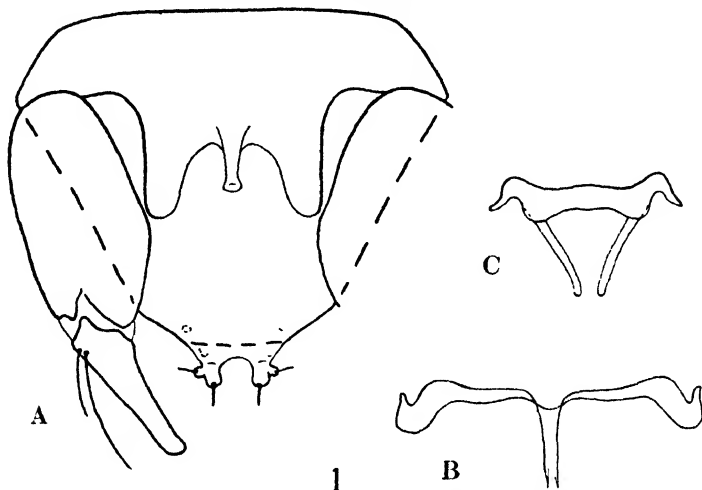
1. A new species of *Dasyhelea* from Hawaii.

FIG. 1.—*Dasyhelea calvescens* sp. n.—hypopygium of male, ventral view; A. 9th segment and clasper; B. harpes; C. aedeagus.

Dasyhelea calvescens sp. n.

A small, very dark brown or blackish species, with wings almost entirely devoid of macrotrichia, scutellum very dark brown, halteres with white knobs, and femora and tibiae dark brown.

♂♀. Length of wing, 0.8–1.0 mm., greatest breadth, 0.3–0.4 mm.

Head very dark brown, blackish. Eyes densely hairy. Palpi darkish brown: segment 3 sub-cylindrical, without pit; lengths of last three segments about 9, 7, and 9 units in male, and 12, 8, and 10 units in female respectively. Antennae very dark brown, the segments sculptured. In male plume rather small, blackish; no segments binodose. Segments 4–12 forming an almost continuous series, measuring in one specimen from 7 by 8 to 7 by 4.5 units; the lengths and greatest widths of the last three segments in the same specimen about 8 by 5, 10 by 6, and 14 by 6 units respectively, the last without stylet. In female segments 4–14 forming an almost continuous series with little alteration of shape between 10 and 11, sub-spherical to oval, measuring in one specimen from 7 by 7 to 8 by 5 units, the last segment longer, about 14 units, tapering distally, without stylet. The combined lengths of segments 3–10, 4–10, and 11–15 about 61, 52, and 47 units respectively. *Thorax* almost uniformly blackish, with short stiff bristles also blackish. Scutellum very dark brown, but not so dark as scutum, and darker at sides than in middle; bearing two

lateral and four centro-marginal bristles, and sometimes one or two small hairs. *Wings* unadorned, but radial veins infuscated. Macrotrichia almost entirely lacking, only a very few at the extreme periphery near the tip, and sometimes one or two on *M*₂. Costa reaching slightly beyond middle of wing. Radial cells not clearly defined: first obliterated; second longer than broad in female, almost square in male. Fork of *Cu* at about same level as middle of first radial cell. Halteres with white knobs. *Legs* brown, with femora, tibiae, and last segments of tarsi darker, dark brown. Form of segments normal. Claws equal, small, about one-third length of last tarsal segment in both sexes. T.R. in both sexes about 2.3. *Abdomen* very dark brown. Spermathecae two, very dark brown, oval, sub-equal, about 50 μ by 40 μ , the duct hardly at all chitinised. Hypopygium (fig. 1) very dark brown. Ninth tergite bearing posteriorly a pair of small processes which are chitinised and armed with short, stout bristles. Ninth sternite without bristles, produced posteriorly into three processes, a median which is conical, and two lateral. Harpes somewhat similar to those of *D. similis* C. I. & M., but median part apparently ending posteriorly in two fine points. Chitinised portions of aedeagus as shown in the figure.

HAWAII: Hanauma Bay, Oahu, 16-19.v.1936, 8 ♂♂, 1 ♀; and Waianae coast, Oahu, 5.vi.1936, 3 ♂♂, 1 ♀; all labelled "rocks by sea," "tidal rocks," or "beach or coast rocks," and some noted as reared from orange pupae (*F. X. Williams*).

This species differs from all other species of *Dasyhelea* with which I am acquainted in having the wings practically devoid of macrotrichia. It belongs to the small group of species in which the antennae are without a stylet, and (in the male) have no binodose segments.

2. Two new species of *Dasyhelea* from the Solomon Islands.

The two species of *Dasyhelea* described below were found in a small collection of midges made by Mr. R. A. Lever in the Solomon Islands. The collection included also the following species: *Styloconops albiventris* de Meij., 48 ♀♀; *Leptoconops* (sens. lat.) sp., 1 ♀; *Culicoides mollis* Edw., 27 ♀♀; and *Culicoides orientalis* Macfie, 4 ♀♀.

Dasyhelea atronotata sp. n.

A brown species with hyaline wings marked with one conspicuous dark brown spot about the middle of the anterior border, covering the second radial cell.

♀. Length of wing nearly 1.0 mm.; greatest breadth nearly 0.45 mm.

Head darkish brown. Eyes hairy. Palpi very pale brown, third segment sub-cylindrical, without a definite pit: lengths of last three segments about 15, 6, and 9 units respectively. Antennae rather pale brown, torus pale brown, but terminal segments of flagellum a little darker. Segments finely sculptured. Segments 4-10 from about 11 by 8 to 9 by 7 units; 11-14 sub-equal, 10-11 by 7 units; 15 longer, about 22 by 7 units, without stylet. The combined lengths of segments 3-10, 4-10, and 11-15 about 79, 66, and 65 units respectively. *Thorax* darkish brown, scutum mottled with darker patches. Scutellum paler, yellowish-brown, bearing 5 bristles but no small hairs. *Wings* clear, colourless, with one conspicuous dark brown spot about middle of anterior border which is square and covers second radial cell and veins enclosing it. Macrotrichia rather scanty, quite colourless and so almost invisible. Costa extending about half length of wing. First radial cell obliterated; second small, square. Fork of *Cu* at about same level as base of second radial cell. Halteres colourless. *Legs* pale brown, femora and tibiae each with a narrow darker

band about the middle. Knees dark. T.R. about 2. Fourth tarsal segments short but not cordiform. Claws small, equal. *Abdomen* rather pale brown; tergites 3 to 7 each with a dark brown oblong area near base on each side of middle line, 8 entirely dark brown. Spermatheca single, very dark brown, oval or obovate, about 40μ by 30μ ; the duct chitinised for a short distance, about 4μ .

SOLOMON ISLANDS: Tulagi, 14.ii.1935, 1 ♀ (*R. A. Lever*).

This insect resembles closely *Thysanognathus monostictus* I. & M. (which perhaps should be regarded as a *Dasyhelea*), a species taken in Zanzibar; the two are indeed so similar that they may prove to be the same notwithstanding the great distance apart of the localities in which they occur.

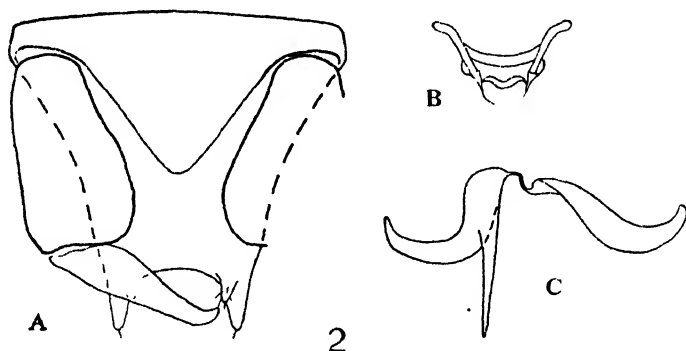


FIG. 2.—*Dasyhelea humilis* sp. n.—hypopygium of male, ventral view; A. 9th segment and clasper; B. aedeagus; C. harpes.

Dasyhelea humilis sp. n.

A small, darkish brown species without any very distinctive feature, with the second radial cell longer than broad, and characteristic hypopygium.

♂♀. Length of wing about 0.8 mm., greatest breadth about 0.26 mm.

Head dark brown. Eyes hairy. Palpi almost colourless, third segment cylindrical, without pit: lengths of last three segments in both sexes about 12.6, and 8 units respectively. Antennae dark brown, segments sculptured. In male, plume dark brown: segments 4–11 ranging from about 10 by 9 to 10 by 4–5 units; 12–14 binodose, sub-equal, 18–22 by 4–5 units; 15 about 16 by 4–5 units, without stylet. In female, segments 4–10 slightly narrowed anteriorly, from about 7 by 7 to 10 by 4–5 units; 11–14 slightly longer, sub-equal, about 11–12 by 4–5 units; 15 about 14 by 4 units, without stylet. The combined lengths of segments 3–10, 4–10, and 11–15 about 71, 63, and 60 units respectively. *Thorax* yellowish-brown with broad dark brown stripes in the usual situations. Scutellum paler, yellowish, bearing 5–6 bristles but no small hairs. *Wings* unadorned. Macrotrichia fairly numerous. Bare areas along the veins distinct. Costa reaching about middle of wing. First radial cell obliterated, second longer than broad in both sexes. Fork of *Cu* proximal to level of end of costa in female, distal in male. Halteres almost colourless. *Legs* pale brown, femora darker than other segments, without distinct bands. T.R. about 2, rather more in female, rather less in male. *Abdomen* darkish brown, not very dark. Spermatheca single, well chitinised, pyriform, about 48μ by 37μ . Components of hypopygium appearing in ventral view as shown in the figures (fig. 2).

SOLOMON ISLANDS: Tulagi, 14.ii.1935, 2 ♂♂, 1 ♀ (*R. A. Lever*).

3. Additional CERATOPOGONIDAE from Trinidad and Grenada.

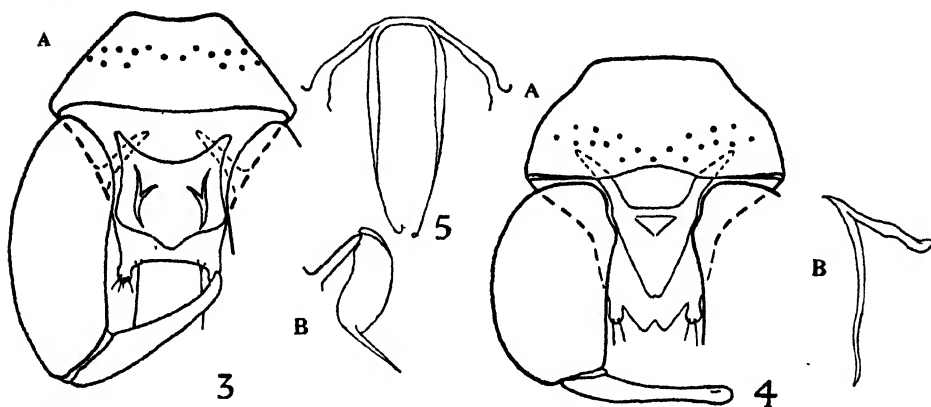
This collection consists of 72 specimens from Trinidad collected by Mr. A. M. Adamson, and 24 from Grenada collected by Mr. C. Munro. The Trinidad specimens belong to fifteen different species, seven of which appear to be new and are therefore described here. The new species I have named after persons prominent in the history of the colony. All the specimens from Grenada are *Culicoides paraensis* (Goeldi).

Forcipomyia ingrami Carter.

TRINIDAD: St. Augustine, 29.viii.1936, 1 ♂, "At light."

Forcipomyia inornatipennis Aust. var. *ornaticrus* Ingram & Macfie.

TRINIDAD: St. Augustine, 30.v.1936, 1 ♂; and 29.viii.1936, 14 ♀♀, "At light."



FIGS. 3-5.—Fig. 3. *Forcipomyia raleighi* sp. n.—hypopygium of male, ventral view.—A. 9th segment and aedeagus; B. harpe. Fig. 4. *Forcipomyia abercrombyi* sp. n.—hypopygium of male, ventral view.—A. 9th segment and aedeagus; B. harpe. Fig. 5. *Forcipomyia pictoni* sp. n.—ventral view of harpes.

Forcipomyia raleighi sp. n.

A brown species with a banded abdomen, bearing scales as well as bristles and hairs. Wings unadorned. Hind legs with a dark brown band on each side of the knee. T.R. about 0.5.

♂♀. Length of wing about 1.5 mm.; greatest breadth about 0.4 mm. in male, 0.5 mm. in female.

Head brown. Palpi darker; basal half of third segment inflated, with a deep pit: length of third segment as great or greater than combined lengths of two terminal segments. *Antennae* brown. In male plume darkish brown, and terminal segments paler than the rest. Segments 4-11 successively narrower, from about 12 by 14 to 13 by 8 units; 12-15 more elongate, about 40, 35, 31, and 35 (including stylet of about 5 units) units respectively in one specimen. In female last five segments darker than rest: segments 4-10 somewhat flask-shaped, from about 13 by 12 to 14 by 9 units; 11-14 more elongate, sub-equal, about 17 by 8 units; 15 about 26 (including stylet of about 4 units) by 9 units. The combined lengths of segments 3-10, 4-10, and 11-15 about 113, 99, and 95 units respectively.

Thorax brown, with darker brown markings. Scutellum dark brown, bearing fairly numerous bristles and hairs. *Wings* unadorned, bearing scales as well as bristles and hairs. Venation normal. First radial cell obsolete, second well formed. Fork of *Cu* at about same level as end of costa in both sexes. Halteres with brown knobs. *Legs* rather pale brown, bearing scales as well as bristles and hairs. Knees pale. Hind legs with a dark brown band on each side of knee. No modified bristles. T.R. about 0.5 in both sexes. *Abdomen* with proximal segments banded; bearing scales as well as bristles and hairs. The banding of the abdomen is most notable in the male, the scales most numerous in the female. Spermathecae two, well chitinated, sub-equal, oval to sub-spherical, about 55μ to 60μ by 45μ to 56μ ; the duct chitinated for only a short distance, about 3μ to 4μ . Hypopygium dark brown, the component parts in ventral view appearing as shown in the figures (fig. 3).

TRINIDAD : St. Augustine, 30.v.1936, 1 ♂; and 8.vi.1936, 11 ♂♂, 3 ♀♀.

***Forelpomyia abercrombyi* sp. n.**

A darkish brown, rather shaggy-looking, species bearing scales in addition to bristles and hairs. *Wings* unadorned. *Legs* banded. T.R. about 1.

♂♀. Length of wing 1.1–1.5 mm.; greatest breadth about 0.4–0.5 mm.

Head dark brown. Palpi dark brown, but with inter-segmental joints pale brown, third segment inflated about middle, with a shallow pit: lengths of last three segments in one female about 23, 10, and 11 units respectively. Antennae rather pale brown. In male plume dark brown, paler at tip: segments 4–11 in one specimen measuring from about 13 by 13 to 15 by 10 units; 12–14 in same specimen about 40, 32, and 23 units respectively; and 15 about 26 (including stylet of about 4 units) by 6 units. In female segments 4–10 flask-shaped, measuring in one specimen from 17 by 11 to 16 by 9 units; 11–14 longer, sub-equal, in same specimen about 19–20 by 8 units; 15 about 26 (including stylet of about 3 units) by 7 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 136, 116, and 105 units respectively. *Thorax* dark brown with traces of usual adornment; the sides not so dark as scutum, more yellowish. Scutellum very dark brown, bearing numerous bristles and hairs. *Wings* unadorned, bearing dark scales. Venation normal. Costa extending about half length of wing. First radial cell obliterated, second well formed. Petiole of *M* rather long. Fork of *Cu* at about same level as base of second radial cell. Halteres with pale knobs. *Legs* banded, with abundant scales. Knees pale. Hind legs with femora all darkish brown excepting at knee, tibiae with two dark brown bands, the one just beyond the knee, the other a little before the distal end, tarsal segments 1 to 4 dark brown excepting at joints, 5 entirely pale. Form of segments and claws normal. T.R. about 1. *Abdomen* darkish yellow-brown, with abundant dark scales. In female posterior extremity very dark, and strengthened to bear tufts of strong bristles. Cerci very dark brown. Spermathecae two, well chitinated, oval to sub-spherical, sub-equal, about 60μ by $42\text{--}56\mu$; hardly any part of the duct chitinated. Hypopygial structures as seen in ventral view as shown in the figures (fig. 4). Side pieces very strong, dark brown at apex, paler at base, bearing very strong bristles; claspers relatively small, yellowish in middle, darker at ends.

TRINIDAD : St. Augustine, 30.v.1936, 1 ♀; 8.vi.1936, 1 ♂, 3 ♀♀, "At light": and 29.viii.1936, 1 ♀, "At light."

***Forelpomyia pietoni* sp. n.**

A small, rather light-coloured, species bearing scales as well as bristles and hairs. *Wings* unadorned. Hind legs with a single, narrow, dark brown band on femora: T.R. about 0.5.

♂. Length of wing about 0.9 mm., greatest breadth nearly 0.3 mm.

Head dark brown. Palpi dark brown at base, but with last two segments pale brown, third segment inflated at base, with a deep pit: lengths of last three segments about 19, 8, and 10 units respectively. Antennae with torus dark brown, flagellar segments pale brown, and plume pale, yellowish: segments 4-11 measuring from about 11 by 11 to 8 by 7 units, 12-14 about 23, 26, and 19 units respectively, and 15 about 24 (including stylet of about 3 units) by 6 units. *Thorax* dorsally very dark brown, sides lighter, yellowish-brown. Scutellum very dark brown, bearing fairly numerous bristles and hairs. *Wings* unadorned, bearing scales. Costa hardly reaching middle of wing. First radial cell obliterated, short; second open but small. Fork of *Cu* distal to level of end of costa. Halteres with colourless knobs. *Legs* pale, yellowish, bearing scales as well as bristles and hairs. Four posterior femora each with a single narrow dark brown band (which may be incomplete) a little before apex. Knees pale. Tibiae unadorned, but with infuscation at the bases of a few exceptionally strong bristles. Tarsal segments pale brown. Form of segments and claws normal. T.R. about 0.5. *Abdomen* pale brown, tergites each with a narrow dark brown band near base; bearing scales as well as bristles and hairs. Hypopygium parti-coloured, distal end of ninth segment and of side pieces dark brown, the rest paler, yellowish. Ninth segment of usual form; sternite not excavated in middle line posteriorly, bearing numerous bristles. Side pieces long and narrow. Claspers slender, with double curve. Harpes (fig. 5) united at base; long rods with filiform, coiled, ends. Aedeagus delicate and difficult to distinguish, apparently of the usual form. Membrane joining aedeagus to ninth sternite not spiculate.

TRINIDAD: St. Augustine, 8.vi.1936, 1 ♂, "At light."

Atrichopogon adamsoni Macfie.

TRINIDAD: St. Augustine, 30.v.1936, 1 ♀; and 29.viii.1936, 2 ♀♀, "At light."

Atrichopogon glaber Macfie.

TRINIDAD: St. Augustine, 29.viii.1936, 2 ♂♂, 3 ♀♀, "At light."

The male, which has not previously been collected, resembles the female excepting in the following particulars.

Antennae with last three and a half segments dark brown: segments 4-11 measuring in one specimen from 11 by 10 to 10 by 7 units; 12-14 about 16, 23, and 20 by 5-6 units; and 15 about 30 (including stylet of 5 units) by 7 units. Scutellum bearing 4 bristles, and one or two small hairs. T.R. rather less, about 2.3. Hypopygium in ventral view as shown in the figure (fig. 6).

In the females, although the wings are practically without macrotrichia, there may be one or two at the extreme periphery at the tip, and the curved processes on the posterior margin of the seventh sternite may have two or three branches.

Atrichopogon insigniventris Macfie.

TRINIDAD: St. Augustine, 29.viii.1936, 1 ♀, "At light."

Atrichopogon woodfordi sp. n.

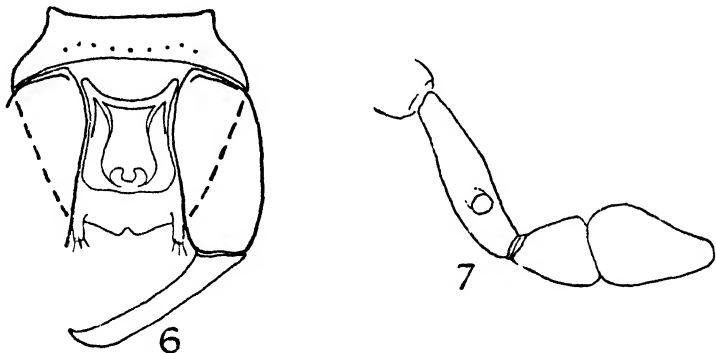
A rather dark yellowish-brown species with fairly numerous macrotrichia on the wings, the first radial cell not open, the abdomen unarmed, and the T.R. about 2.

♀. Length of wing about 1.1 mm., greatest breadth about 0.4 mm.

Head dark brown. Eyes hairy in part at least. Palpi dark brown, third segment inflated about middle, with a deep pit: lengths of last three segments about 13, 9, and 10 units respectively, the last broad at base and rather pointed at tip. Antennae very dark brown: segments 4–10 from sub-spherical to oval, measuring in one specimen from 8 by 8 to 10 by 6 units; 11–14 elongate, sub-equal, in the same specimen about 20–22 by 6 units; 15 about 33 (including long stylet of about 7 units) by 5 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 72, 61, and 117 units respectively. *Thorax* dark yellowish-brown, with darker brown scutal adornment of usual pattern. Scutellum slightly paler than scutum, bearing four dark bristles, and one or two small hairs. *Wings* unadorned, but brownish. Macrotrichia fairly numerous at tip, but only a very few between branches of *Cu*, and none, or only one or so, in anal cell. Costa extending a little more than two-thirds length of wing. First radial cell almost obliterated, represented by a line; second long and narrow. Petiole of *M* hardly as long as cross-vein. Fork of *Cu* distal to that of *M*, at about same level as distal part of first radial cell. Angle formed by branches of *Cu* much less than a right angle. Halteres with pale brown knobs. *Legs* almost uniformly yellowish-brown, rather dark, with terminal tarsal segments infuscated. T.R. only about 2. Form of segments, claws, and empodium normal. *Abdomen* not so dark as scutum, unarmed. Spermatheca single, highly chitinised excepting at base, pyriform, total length about 92 μ , and greatest breadth about 62 μ .

TRINIDAD: St. Augustine, 29.viii.1936, 2 ♀♀, "At light."

This species resembles in some respects *A. flumineus* Macfie, but is smaller, has fewer macrotrichia on the wings, and has the first radial cell practically obliterated.



FIGS. 6–7.—Fig. 6. *Atrichopogon glaber* Macfie, hypopygium of male, ventral view. Fig. 7. *Atrichopogon gordonii* sp. n., palp of female.

Atrichopogon harrisi sp. n.

A very dark brown or blackish species resembling in structural characters *A. glaber* Macfie, but differing as indicated below.

♀. Length of wing about 1.0 mm., greatest breadth about 0.4 mm.

Head blackish. Eyes hairy. Palpi very dark brown, similar to those of *A. glaber*, third segment with a deep pit. Antennae very dark brown, torus as dark as the rest: segments 4–10 from slightly flattened to oval, measuring in the unique specimen from about 6 by 8 to 8 by 7 units; 11–14 elongate, successively longer, from 16 by 7 to 22 by 7 units; 15 about 29 (including pointed stylet of about 5 units) by 6 units. The combined lengths of segments 3–10, 4–10, and 11–15 about 58, 48, and 107 units respectively. *Thorax* blackish. Scutellum blackish. *Wings* unadorned, brownish. Macrotrichia scanty, a few at tip in

cells *R5* and *M1*. Both radial cells well formed, the second over three times as long as the first. Petiole of *M* about same length as cross-vein. Fork of *Cu* distal to that of *M*. Angle formed by branches of *Cu* much less than a right angle. Halteres with dark brown knobs. Legs dark brown. T.R. about 2.6. Form of segments, claws, and empodium normal. Abdomen blackish, the cerci a little paler. Spermatheca single, highly chitinised, pyriform, total length about 89 μ , and greatest breadth about 56 μ . Ventral armature similar to that of *A. glaber*, but in the unique specimen the median process on the posterior border of the seventh sternite is very dark brown, and is composed of a stout common stem from which arise three short, irregular, processes.

TRINIDAD : St. Augustine, 29.viii.1936, 1 ♀, "At light."

Atrichopogon gordonii sp. n.

A rather dark yellowish-brown species with few macrotrichia on the wings, the first radial cell almost obliterated, the abdomen armed, and the T.R. about 2.3.

♀. Length of wing about 1.3 mm., greatest breadth about 0.46 mm.

Head dark brown. Eyes hairy in part at least. Palpi (fig. 7) very dark brown, third segment rather slender, sub-cylindrical, with a small pit, last two segments broader, together forming an oat-shaped body; lengths of last three segments about 18, 8, and 12 units respectively. Antennae very dark brown, torus as dark as the rest: segments 4-10 from sub-spherical to oval, measuring in the unique specimen from 10 by 10 to 9 by 8 units; 11-14 elongate, successively longer, from 23 to 27 units; 15 about 39 units including the pointed stylet of about 8 units. The combined lengths of segments 3-10, 4-10, and 11-15 about 76, 64, and 140 units respectively. Thorax dark yellowish-brown, with darker brown markings on scutum forming usual pattern. Scutellum paler brown, bearing four bristles. Wings unadorned, brownish. Macrotrichia scanty, a few in cell *R5*, and none elsewhere, or just one or two in cell *M1*. Costa extending about two-thirds length of wing. First radial cell almost obliterated, a mere line; second well formed, long and narrow. Petiole of *M* hardly as long as cross-vein. Fork of *Cu* distal to that of *M*. Angle formed by branches of *Cu* much less than a right angle. Halteres with brownish knobs. Legs almost uniformly yellowish-brown, but terminal tarsal segments somewhat infuscated. T.R. about 2.3. Form of segments, claws, and empodium normal. Abdomen a dull brown, not so dark as scutum, the dorsum darker than the venter. Spermatheca single, highly chitinised, large, sub-spherical or oval, about 100 μ by 81 μ ; the duct narrow and chitinised for about 11 μ . Armature somewhat similar to that in *A. glaber*. On the posterior margin of the seventh sternite is a pale brown, tassel-like, tuft composed of a short stem from which arise two groups each of three long, pointed, processes. Immediately posterior to this tuft is a group of long finger-like processes; and on each side a small triangular, tooth-like, chitinised projection, and three bristles.

TRINIDAD : St. Augustine, 29.viii.1936, 1 ♀, "At light."

Culicoides debilipalpis Lutz.

TRINIDAD : Near Tetron Bay, 16.v.1936, 1 ♀.

Culicoides guttatus Coq.

TRINIDAD : St. Augustine, 6.xi.1934, 1 ♀, "At light," and 29.viii.1936, 4 ♀♀, "At light"; and Nariva Ferry, 5.vii.1936, 1 ♀.

Culicoides paraensis Goeldi.

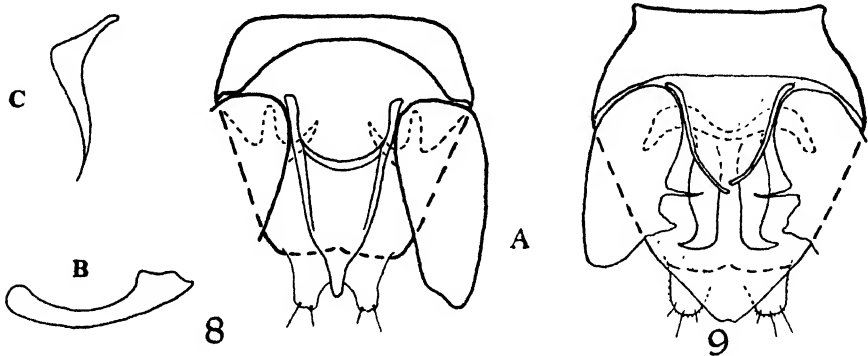
GRENADA : St. Andrew's, 14.ix.1937, 24 ♀♀ (*C. Munro*).

Culicoides stellifer Coq.

TRINIDAD : St. Joseph, 14.v.1936, 3 ♀♀.

Culicoides pusillus Lutz.

A very small species with the head and thorax very dark brown, and the abdomen and legs paler brown. Wings with a small dark area in the middle of the anterior border, and a few quite ill-defined pale areas in the usual situations. Macrotrichia almost entirely absent.



FIGS. 8-9.—Fig. 8. *Culicoides pusillus* Lutz, hypopygium of male, ventral view—A. 9th segment and aedeagus; B. clasper; C. harpe. Fig. 9. *Stilobezzia chaconi* sp. n., hypopygium of male, ventral view.

♂, ♀. Length of wing about 0.8-0.9 mm., greatest breadth about 0.3 mm.

Head very dark brown. Eyes separated above in both sexes, more widely in male than in female. Palpi almost colourless, third segment slightly inflated, with a shallow pit; lengths of last three segments about 10, 7, and 6 units respectively. Antennae pale brown. In male plume brown: last three segments elongate, in one specimen measuring 22, 16, and 21 by 4-5 units respectively. In female segments 4-10 from sub-spherical to oval, in one specimen measuring from 5 by 5 to 7 by 4 units; 11-14 sub-equal, about 10-11 by 4 units; 15 about 16 by 4-5 units. The combined lengths of segments 3-10, 4-10, and 11-15 about 50, 42, and 58 units respectively. *Thorax* very dark brown. Adornment (if any) not visible in the specimens examined which had been preserved in spirit. Scutellum very dark brown, bearing 3 bristles, but no small hairs. *Wings* pale, with a single conspicuous dark spot covering second radial cell and distal part of first. Pale areas very ill defined, as shown in Lutz' (1913) excellent figure. Macrotrichia almost wanting: in male, none; in female, a very few near periphery at tip. Venation normal; both radial cells formed. Halteres with almost colourless knobs. *Legs* pale brown, knees dark. Form of segments and claws normal; fourth tarsal segments not cordiform. T.R. about 1.8. *Abdomen* brown, much paler than thorax. In female cerci pale; in male hypopygium dark brown. Spermathecae two, well chitinised, oval, sub-equal, about 40μ by 30μ ; the duct chitinised for a short distance, 3-4 μ . Hypopygium appearing in ventral view as shown in the figures (fig. 8). The claspers are pale, yellowish. The membrane joining the aedeagus to the ninth tergite is not spiculate.

TRINIDAD : St. Augustine, 29.viii.1936, 5 ♂♂, 4 ♀♀, "At light."

This species is briefly redescribed because so far as I can ascertain it has not been recorded since it was named by Lutz in 1913, and the original

description lacks certain details (e.g. those of the hypopygium) now necessary for identification.

***Stilobezzia chacon* sp. n.**

A very dark brown or blackish species with the scutellum blackish, bearing three bristles, the first tarsal segments of the hind legs without a basal spine, and the wings unadorned and without macrotrichia.

♂. Length of wing nearly 1.7 mm., greatest breadth about 0.45 mm.

Head very dark brown. *Palpi* very dark brown, third segment subcylindrical, without definite pit: lengths of last four segments about 18, 19, 12, and 18 units respectively. *Antennae* very dark brown, plume large and dark: segments 4–11 measuring from about 15 by 11 to 17 by 7 units; 12 about 21 by 7 units; 13 and 14 much elongated, about 55 units; and 15 still longer, about 75 by 4 units. *Thorax* blackish. *Scutellum* blackish, bearing two lateral and one centro-marginal bristle, but no small hairs. *Wings* unadorned, of usual form, without macrotrichia. *Costa* extending rather more than two-thirds length of wing. First radial cell narrow; second much wider, and nearly four times as long as first. Cross-vein and distal portion of *R*₁ not in line. Petiole of *M* long, over three times as long as cross-vein. Fork of *Cu* a little proximal to level of fork of *M*. Halteres with darkish brown knobs. *Legs*. Femora on four posterior legs entirely very dark brown, on fore legs paler brown. Tibiae on middle and hind legs entirely very dark brown, on fore legs pale brown in middle and slightly darker at ends. Tarsal segments on all legs almost colourless, but fourth and fifth somewhat infuscated. First tarsal segment of hind legs without a basal spine. Form of segments and claws normal. T.R. about 2. *Abdomen* very dark brown above, venter rather paler. Hypopygium in ventral view appearing as shown in the figure (fig. 9). The harpes with hook-like ends which are infuscated.

TRINIDAD: St. Augustine, 29.viii.1936, 1 ♂, "At light."

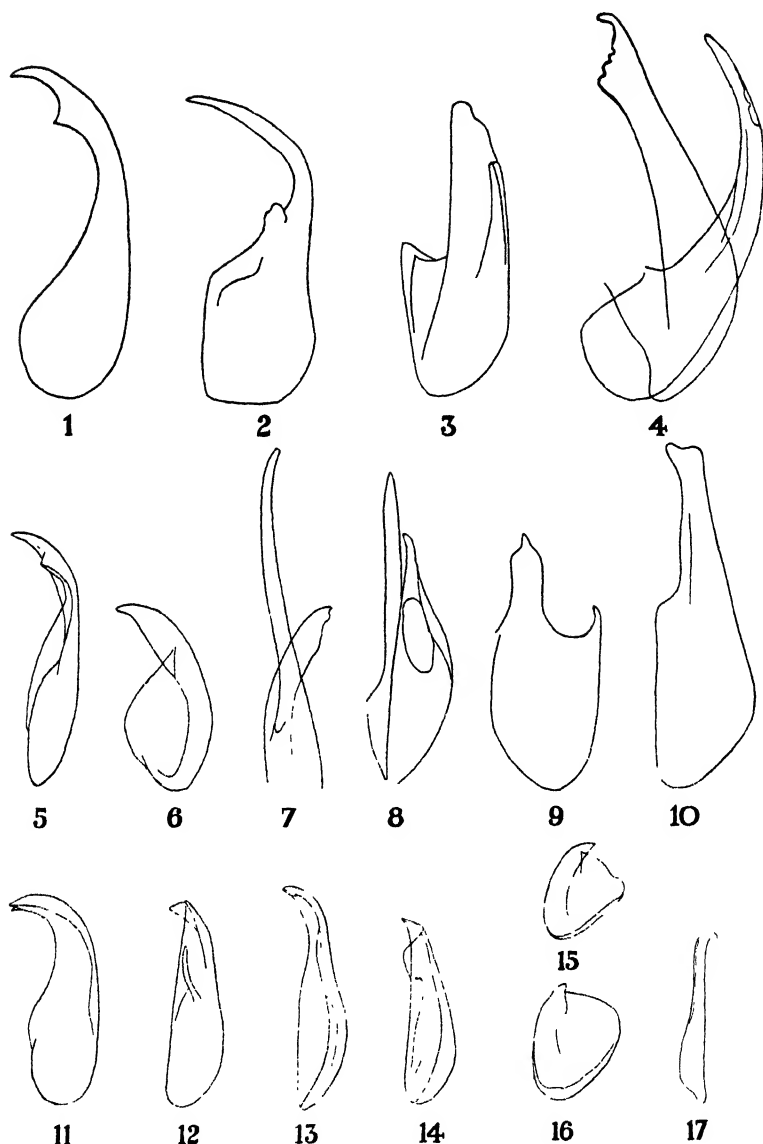
A REVISION OF THE MALAYAN SPECIES OF *PRATAPA*
MOORE (LEPIDOPTERA-LYCAENIDAE) *

By A. STEVEN CORBET, F.R.E.S.

THE genus *Pratapa* Mre. was revised by Fruhstorfer (1911, *Berlin. ent. Z.*, 56: 197–272) in an important paper dealing with the Indo-Australian THECLINAE and PORITIINAE. This revision formed the basis of the monograph by Seitz (1926, *Grossschmett. Erde*, 9: 970–972), in which all the important forms are accurately figured. The Indian species were dealt with by Evans (1932, *Ident. Ind. Butt.*: 279–281), whose key has been adapted in the present paper to fit the Malaysian species, and the Javanese species were considered by Piepers and Snellen (1918, *Rhop. Java*: 91–95).

With the exception of *P. vidua*, which is local on the forested hills and foothills, all the *Pratapa* species are rare in Malaysia and, with many subspecies, the females are unknown. The Malaysian representatives of the *Pratapa* species differ from the more northerly races in the much more extensive orange subternal patch on the hind-wing beneath but, as a rule, the Malayan, Sumatran, Bornean and Javanese forms of any one species show little geographical differentiation.

* Although I have altered certain adjectival trivial names to agree with the gender of the generic name in accordance with Article 14 of the International rules of zoological nomenclature, I am of the opinion that Article 19 should be adhered to rigidly so that the original spelling may be preserved in all cases.



FIGS. 1-17.—Male clasper of (1) *Pratapa penicilligera* (Nic.) (Assam); (2) *P. penicilligera* (Nic.) (Burma, Dawngas); (3) *P. cotys* (Hew.) (Assam); (4) *P. sunno* Drc. (Borneo) holotype; (5) *P. burmana* (Mre.) (Pulau Langkawi); (6) *P. vidura sinhara* (Fruh.) (Malaya); (7) *P. ctesia ctesia* (Hew.) (Malaya); (8) *P. blanka blanku* (Nic.) (Malaya); (9) *P. cremana* Nic. (Java); (10) *P. capusa* (Fruh.) (Nias) holotype; (11) *P. lowii* (Drc.) (Borneo) holotype; (12) *P. deva stella* subsp. n. (Malaya); (13) *P. icetoides carmentalis* (Nic.) (Assam); (14) *P. icetoides carmentalis* (Nic.) (Assam); (15) *P. cleobis cleobis* (Godt.) (Assam); (16) *P. queda* sp. n. (Malaya) holotype; (17) *P. anysis* (Hew.) (Celebes) holotype. In the case of Fig. 4 both claspers are shown.

Examination of the male genitalia.

In the genus under consideration, the male genitalia usually differ considerably from one species to another, while certain species in the *P. cotys* group, which would be considered as the Burmese, Bornean and Javanese races of a single collective species on the basis of the similarity in fascies, show such remarkable differences in genitalia that they must be regarded as specifically distinct. In the case of *P. penicilligera* (Nic.), the male clasper shows an unusual transformation within a somewhat restricted zoo-geographical area : on the other hand, the species *P. anysis* (Hew.) and *P. anysides* (Röb.), which differ only in secondary sexual characters, have identical genitalia, and the case of *P. cleobis* (Gödt.) and *P. queda* sp. n. is somewhat analogous.

Pratapa Mre.

Pratapa Moore, 1881, *Lep. Ceylon*, 1 : 108. Type = *Amblypodia deva* Mre., 1857.
Camena Hewitson, 1865, *Ill. diurn. Lep.* : 47. Type = *Camena ctesia* Hew., 1865. Preoccupied by *Camaena* Baly, 1862, in Coleoptera.
Dacalana Moore, 1884, *J. asiat. Soc. Bengal*, 53 : 36. Type = *Amblypodia vidura* Hsf., 1829.
Arrhenothrix de Nicéville, 1890, *Butt. Ind. Burmah, Ceylon*, 3 : 336. Type = *Arrhenothrix penicilligera* Nic., 1890.

Eyes smooth; palpi smooth; antennal club gradual and cylindrical. Fore-wing with veins 5 and 6 well separated at their origins. Hind-wing with approximately equal tails at veins 1b and 2. Male with a brand on the upperside of the hind-wing near the origin of vein 7. Both sexes blue or greenish-blue above and without a white subternal area on the hind-wing.

Differs from the closely allied genus *Tajuria* Mre. (with type *Hesperia longinus* F., 1798), in the possession of the hind-wing brand and in the area of specialised scales, bearing one or more hair tufts, below the median on the fore-wing beneath.

Some authors separate species of the *P. vidura*, *P. cotys* and *P. lowii* groups as *Dacalana*. It is difficult to justify this procedure, for the male genitalia show *P. lowii* and the *P. vidura* group (both with a hair tuft on the upperside of the fore-wing) to be closely allied, while a separation on the basis of the white median line on the hind-wing beneath would unite the *P. cotys* and *P. vidura* groups and separate them from *P. lowii*.

The presence or absence of vein 9 on the fore-wing is a variable character and cannot be used to separate *P. vidura* and *P. penicilligera*.

Key for the separation of the Malaysian species of Pratapa.

- 1 (8). Un with white median band.
- 2 (7). ♂ upF with a prominent brand.

vidura group.

- 3 (4). Un discal line composed of curved streaks *burmana*.
4. Un discal line composed of straight, contiguous streaks.
- 5 (6). UnH discal line in spaces 6 and 7 not outwardly shaded with white :
 orange subternal area broad and prominent *vidura*.
6. UnH discal line outwardly shaded with white in spaces 6 and 7 :
 orange subternal area narrow and obscure *penicilligera*.
7. ♂ upF without a brand.

cotys group.

8. Un without a white median band.
- 9(11). ♂ upF with a prominent brand.

lowii group.

10. Un narrow, dark discal line as in *vidura* group *lowii*.
11. ♂ upF without a brand.
- 12(15). 3rd joint of palpi long and in line with 2nd joint. F veins 5 and 6 approximate at their origins.

ctesia group.

- 13(14). Un with discal series of separate dark streaks and broad cell-end bars *ctesia*.
14. Un with dark narrow discal line, on F faint in ♂ and obsolete in ♀: no cell-end bars *blanka*.
15. 3rd joint palpi short and bent down at an angle with 2nd joint. F veins 5 and 6 separate at their origins.
- 16(24). ♂ unF with a single tuft of long hairs.
- 17(22). UnF discal line not nearer cell-end than termen.

deva group.

- 18(19). UnF discal line composed of separate commas. ♂ unF tuft black . *deva*.
19. UnF discal line composed of straight, contiguous streaks.
- 20(21). Un uniform, pale greyish-brown. ♂ unF tuft yellow *icetoides*.
21. Un whitish-grey and not uniformly coloured. ♂ unF tuft black . *icetas*.
22. UnF discal line nearer cell-end than termen.

queda group.

23. Un greyish-brown, with rather sinuate discal line. ♂ unF tuft black *queda*.
24. ♂ unF with two hair tufts.

cleobis group.

25. UnF discal line nearer cell-end than termen. ♂ unF inner tuft long and black, outer tuft short and creamy-white *cleobis*

1. *Pratapa burmana* (McC.).

Dacalana burmana Moore, 1884, *J. asiat. Soc. Bengal*, 53 : 36; ♂, Moumein.

Dacalana vidura burmana Seitz, 1926, *Grossschmett. Erde*, 9 : 970.

Dacalana vidura burmana Corbet and Pendlebury, 1934, *Butt. Malay Penin.*, pl. xiii, f. 189 ♂.

In the Malay Peninsula the species appears to be known only from Kedah and from Pulau Langkawi, off the coast of Kedah.

2. *Pratapa vidura sinhara* (Fruh.).

Amblypodia vidura Horsfield, 1829, *Cat. Lep. Mus. E. Ind. Co.* : 113, pl. i, f. 6, 6a ♂; Java.

Dacalana vidura sinhara Fruhstorfer, 1914, *Deuts. ent. Z. "Iris"*, 27 : 175; ♂♂, North-east Sumatra.

Dacalana vidura sinhara Seitz, 1926, *Grossschmett. Erde*, 9 : 970.

P. vidura is a Malaysian species, extending northwards to South Burma. In both sexes, Malayan specimens resemble the Sumatran form. Other Malaysian races are *aziyada* (Fruh.), Borneo (Seitz, pl. 155 a 8 ♂ und.) and *baganda* (Fruh.), East Java (Seitz, pl. 155 a 6 ♂, 7 ♀ und.) : the nominotypical form from West Java is figured in Piepers and Snellen, f. 143 a ♂, b ♀.

P. penicilligera (Nic.) (Seitz, pl. 155 b 1 und., 2 ♂), described from the Khasi Hills in Assam, is a species quite distinct from *P. vidura*, which it closely resembles. de Nicéville's species is represented in the British Museum from Bhutan, Assam, Burma and North Siam : in examples from the first two localities the male clasper has a subterminal, lateral, triangular process which is absent from specimens from the two southern localities.

The *P. cotys* group.

Examination of the male genitalia has shown that *P. cotys* (Hew.) (Seitz, pl. 155 e 2 ♂, 3 und.), described from Nepal and of which *cotoides* (Tytler) may be a form, *P. sannio* H. H. Drc., Borneo (Seitz, pl. 156 a 8 und.), and *P. cremara* (Nic.), Java (Seitz, pl. 155 e 4 und. and P. & S., f. 144 ♂) are all distinct species, although the fascies suggest that they may be geographical representatives of one collective species. It is possible that *capusa* (Fruh.), Nias (Seitz, pl. 155 e 5 ♂) may be a strongly differentiated subspecies of *P. sannio* for, in these two, the upturned hairs on the dorsum on the hind-wing beneath in the male have the same colour as the greyish-brown ground, while in *P. cotys*, *P. cremara* and *P. anysis* (Hew.) they are black. The differences in the male genitalia of *P. sannio* and *P. capusa* are of degree rather than of kind and recall those found in the Bornean and Nias races of *Jamides zebra* (H. H. Drc.).

Toxopeus (1929, *Tijd. Ent.*, 72 : 224) placed *cremara* as a race of **P. anysis* (Hew.), (Seitz, pl. 155 e 6 ♂, 7 und.), but the differences in wing shape, upper-side colouring and male genitalia are so profound that there can be no doubt of their specific distinctness.

de Nicéville and Martin (1895, *J. asiat. Soc. Bengal*, 64 : 473) recorded two males of *P. cotys* from Sumatra, but no forms of the *P. cotys* group are known to me from the Malay Peninsula or Sumatra, although it is almost certain that they must occur.

P. lowii (H. H. Drc.) (Seitz, pl. 156 a 7 ♂ und.) is known only from the unique holotype from Labuan. It differs from Bornean *P. vidura* in the more convex termen and less pointed apex of the fore-wing and in the more purple colour of the upperside: on the hind-wing beneath, the tornal half of the discal line is outwardly whitened and the black subternal spot in space 2 is only narrowly fringed with orange.

3. *Pratapa ctesia ctesia* (Hew.).

Camena ctesia Hewitson, 1865, *Ill. diurn. Lep.* : 48, pl. xx, f. 1, 2 ♂; North India.

Camena ctesia ctesia Seitz, 1926, *Grossschmett. Erde*, 9 : 971, tpl. 155 d 2 ♂.

A rare species in Malaya, known only from altitudes of 3500 feet and above. The species is rather variable and a Malayan male in my collection hardly differs from males from Sikkim and Darjiling.

The Formosan subspecies is *cakravasti* (Fruh.) (Seitz, pl. 155 d 3 ♂, 4 und.).

4. *Pratapa blanka blanka* (Nic.).

Tajuria blanka de Nicéville, 1895, *J. asiat. Soc. Bengal*, 63 : 39, pl. iv, f. 4 ♀; North-east Sumatra.

Pratapa lucidus H. H. Druce, 1895, *Proc. zool. Soc.*, 1895 : 596, pl. xxxiii, f. 3 ♂; Labuan.

Camena lucida lucida Seitz, 1926, *Grossschmett. Erde*, 9 : 972, pl. 156 a 1 ♂.

Males of Sumatran *blanka* and Bornean *lucida* cannot be separated on the material in the British Museum, the blue dusting on the black subapical area of the fore-wing being rather variable. Females appear to be excessively rare in Malaysia.

* *Iolaus anysis* Hewitson, 1865, *Ill. diurn. Lep.* : 42, pl. xix, f. 17, 18 ♂; Celebes (Macassar). A British Museum male from Minahassa differs from the male type of *anysis* in lacking the black brand in the nacreous area on the upperside of the hind-wing, but the genitalia appear to be identical in both specimens. The Minahassa male may be referable to *P. anysidus* (Röb.) (*Iolaus anysidus* Röber, 1887, *Iris*, 1 : 194; ♂, East Celebes).

† The figure on pl. 155 d 1 representing the underside is incorrect.

The Malayan representative, which is rare in the forested plains and foot-hills, may differ, perhaps, from the nominotypical form in the rather more extensive orange tornal area on the hind-wing beneath.

Other Malaysian subspecies are *nacandra* (Fruh.), Java (Seitz, pl. 155 e 1 und. and P. & S., f. 149 ♂, 92 ♀) and *damara* (Fruh.), Palawan. The North Indian race *minturna* (Fruh.) (Seitz, pl. 155 d 6 ♂, 7 und.—rather poor) differs in the prominent discal line on the underside of the fore-wing, and South Indian *argentea* Auriv. (= *sudica* Evans) (Seitz, pl. 155 d 5 ♂) is another well-differentiated subspecies.

5. *Pratapa deva stella* subsp. n.

Amblypodia deva Moore, 1857, in Horsfield & Moore, *Cat. Lep. Mus. B. Ind. Co.*, 1 : 46; ♂♀, Canara. Figured in Seitz, pl. 155 b 9 ♂, c 1 ♀.

The Malayan representative constitutes a new subspecies.

♂. Nearest to Bornean *devana* H. H. Drc. ♂ (1895, *Proc. zool. Soc.*, 1895 : 597, pl. xxxiii, f. 4 and Seitz, pl. 155 c 3), but the upperside is deeper blue and, on the fore-wing, vein 1 is broadly blackened for about 1 mm. after entering the blue area. On the underside of the hind-wing, the orange area surrounding the black subternal spot in space 2 is much broader, paler and yellower.

Wing expanse 33 mm.

Holotype. MALAY PENINSULA, Selangor, Bukit Kutu, 3300-3500 feet, 23.ix.1932 (*H. M. Pendlebury*) (Selangor Museum). Two males in my collection from the same locality.

Other *P. deva* subspecies are *angada* (Fruh.), North India (Seitz, pl. 155 c 2 ♂), *lila* Mre., Assam and Bengal, *cartena* (Fruh.), West Java (Seitz, pl. 155 c 6 ♂, 7 ♀, 8 und. and P. & S., f. 150 ♂), and *methara* (Fruh.), East Java : *devadatta* (Fruh.), South Borneo (Seitz, pl. 155 c 4 ♀), was described as a *deva* race but is not known to me.

6. *Pratapa icetoides calculis* H. H. Drc.

Camena icetoides Elwes, 1892, *Proc. zool. Soc.*, 1892 : 636, pl. xlv, f. 3 ♂; Karen Hills.

Pratapa calculis H. H. Druce, 1895, *Proc. zool. Soc.*, 1895 : 598, pl. xxxiii, f. 6 ♂, 7 ♀; Kina Balu.

Camena ister calculis Seitz, 1926, *Grossschmett. Erde*, 9 : 971, pl. 155 b 8 ♂.

A Malayan male of *P. icetoides* from Selangor (Klang Gates, 8.i.1924, *H. M. Pendlebury*) agrees exactly with a Bornean male in the British Museum, although this latter specimen lacks the prominent whitening of the outer edge of the discal line on the underside shown in Druce's original figures; Javanese *cretheus* (Nic.) also hardly differs.

Other *P. icetoides* races, placed under *ister* in Seitz, are *carmentalis* (Nic.), Assam, *cretheus* (Nic.), West Java and North-east Sumatra (Seitz, pl. 155 b 6 ♂, 7 ♀ and P. & S., f. 151 ♂), *ecphantus* (Fruh.), East Java (Seitz, pl. 155 b 5 ♂), and *yasa* (Fruh.), Nias.

All *P. icetoides* subspecies have the base of the costa on the fore-wing beneath tinged with yellow in both sexes and thus can be readily separated from the rather similar *P. icetas* (Hew.) (with subspecies *extensa* Evans and *mishmia* Evans), which is not yet known south of Burma.

7. *Pratapa queda* sp. n.

♂. In general appearance resembles typical *P. cleobis* (Godt.) ♂, from Assam, but is larger in size, the wings are longer, the fore-wing termen is more strongly convex and the apex more pointed.

Upperside.—Compared with *P. cleobis* ♂, the blue colour is paler, more powdery and has a greenish hue, and the hind-wing blackish-brown distal border is broader and inwardly irregular and diffuse; the hind-wing tails are longer, that at vein 1b broken in type but at least 5 mm. and that at vein 2 is 5 mm.

Underside.—The narrow, deep reddish-brown discal band is more maculate on the fore-wing consisting of a series of curved contiguous streaks and, on the hind-wing, it is very narrowly whitened only in the tornal half. The black, circular, subternal spot (1 mm.) in space 2 and the larger black spot in the lobe lie in an extensive orange-yellow area which extends from the inner margin to space 4 and reaches the discal line in spaces 1b, 1c and 2.

The secondary sexual characters on the hind-wing above and on the fore-wing beneath as in *P. cleobis*, except that the nacreous area on the underside of the fore-wing has a single tuft of long black hairs. The male genitalia differs in no important respect from *P. cleobis*.

Wing expanse 38.5 mm.

Holotype. MALAY PENINSULA, Kedah, Kedah Peak, 3300–3900 feet, 25.iii.1928 (*H. M. Pendlebury*). In Selangor Museum. Recorded by Evans (1933, *J. F.M.S. Mus.*, 17 : 411) as *P. cleobis*.

Pratapa cleobis Godt.

Polyommatus cleobis Godart, 1823, *Encyc. Méth.*, 9 : 634; ♂♀, Bengal.
Tajuria cleobis Seitz, 1926, *Grossschmett. Erde*, 9 : 975, pl. 156 c 3 ♂.

The species has been recorded from Malaya by Evans (1933, *J. F.M.S. Mus.*, 17 : 411), but it appears that the specimens in question are referable to the previous species : I have seen no Malaysian specimens.

Of the *Pratapa* forms considered in this paper, the types of the following have been examined at the British Museum : *angada* Fruh., *anysis* Hew., *aziyada* Fruh., *baganda* Fruh., *burmana* Mre., *capusa* Fruh., *cartena* Fruh., *cotys* Hew., *damara* Fruh., *deva* Mre., *extensa* Evans, *lila* Mre., *lowii* H. H. Drc., *lucida* H. H. Drc., *minturna* Fruh., *mishmia* Evans, *nacandra* Fruh., *sannio* H. H. Drc., *sinhara* Fruh., *sudica* Evans, *vidura* Hsf. and *yasa* Fruh.

I am indebted to the Trustees of the British Museum (Natural History) for permission to study their collections, to Mr. H. M. Pendlebury, Director of Museums, F.M.S., for the loan of specimens, and to Brigadier W. H. Evans, C.S.I., C.I.E., D.S.O., for the gift of specimens from India and Burma.

ON THE BRITISH LESTREMIINAE, WITH NOTES ON EXOTIC SPECIES.—4. (DIPTERA, CECIDOMYIIDAE)

By F. W. EDWARDS, M.A., Sc.D., F.R.E.S.

Campylomyzini.

THIS tribe includes by far the largest number of species of the subfamily. The habits of the species are varied; many, perhaps the majority, live in dead wood; some are coprophilous or feed in fungi; one is recorded as injurious to the roots of clover. The flies are found mainly in spring and autumn, along hedgerows, on windows, and about old logs and fallen timber.

In addition to the main characters already indicated (Part I of this series, p. 24), a feature of this tribe is the arrangement of the pores on the wing-veins. These pores are here usually six in number, three being situated on *R1* (two of these close to the tip of the vein), one at the junction of *Rs* and *rm*, the fifth either on *rm* or (as in fig. 8, f) on *R5* near its base; the sixth (when traceable) near or beyond middle of *R5*. The position of pore no. 5 (whether on *rm* or on *R5*) seems to be of considerable importance in classification, though the pores are not always easy to detect unless the specimens are suitably mounted.

The numerous genera of Campylomyzini are rather badly in need of re-definition, a task which has been attempted in the ensuing pages. Many of the genera already proposed are so very similar that a reduction rather than an increase in their number seems desirable, but the genera are at least as well defined as those of the CECIDOMYIIDAE, and I am, therefore, not proposing at present to carry this process of reduction very far. The following is an outline of the classification of the tribe here adopted; the three main groups are defined principally on wing-venation and the position of pore 5, but other supporting characters are found in the legs and hypopygium.

GROUP I. Costa produced, extending more than half-way from tip of *R5* to tip of *M*, usually nearly to *M*. *R1* long, at least three times, usually 4–6 times, as long as *Rs*. Pore no. 5 on *R5*, but well before level of tip of *R1*. Tarsi not scaly. Empodium always well developed. Palpi 4-segmented, the first segment not enlarged. Flies found mainly along hedgerows and on windows.

Genera: *Campylomyza*, *Cordylomyia*, *Corinthomyia*.

GROUP II. Costa as in Group I. *R1* shorter, rarely more than three times and usually less than twice as long as *Rs*. Pore no. 5 on *rm*. Palpi often 3-segmented, first segment often somewhat enlarged. Flies found chiefly in woods.

Subgroup A. Empodium as long as claws and quite broad. Usually largish species with shining black thorax. Tarsi and palpi without distinct scales.

Genus: *Xylopriona* (including *Tetraxyphus*).

Subgroup B. Empodium rudimentary, or when (in a few cases) as long as the claws, then quite narrow. Thorax not shining black. Tarsi and palpi often with distinct scales.

Genera: *Aprionus*, *Bryomyia*, *Micromyia*, *Monardia*, *Mycophila*, *Pezomyia*, *Trichopterymyia*.

GROUP III. Costa ending abruptly at tip of *R5*, or if reaching slightly beyond then ending well before midway between tips of *R5* and *M*. *R1* rather short, usually less than

three times as long as *rm*, and usually somewhat more curved up towards costa at tip than in Groups I and II. Pore no. 5 on *R5*, usually approximately at level of tip of *R1*. Palpi often with less than 4 segments. Flies run much more actively than those of the other two groups; found chiefly in summer. Size usually very small.

Genera: *Joannisia*, *Peromyia*.

Campylomyza Mg.

Amblyspatha Kieff., ♂; *Cylophora* Kieff.; *Neurolyga* Rond.?; *Prionellus* Kieff.; *Urosema* Kieff.?

In a paper published early this year (1938, *Encycl. Ent. (Diptera)*, 9 : 47-52) I redefined this genus in accordance with a study of Meigen's type-specimens. The generic diagnosis there given is repeated below with slight modifications (e.g. the erroneous statement that the empodium is hairy *above* is corrected) :

Eyes each so much narrowed above the middle that a small upper part is completely separated from the large lower part by a gap in which there are either no facets at all or (occasionally) one or two irregularly placed; the small upper portions of the two eyes are practically fused in the middle line (fig. 8, a, b). The small frons is flat and without scales or hairs. Antennae of ♂ with 2 + 12 segments, the flagellar segments not very excentric, each with two complete crenulate whorls and another incomplete one distally, sensoria rudimentary. Antennae of ♀ with 2 + 10 to 2 + 12 segments, flagellar segments each with a subapical membranous collar forming a complete cup-shaped structure, this cup arising from numerous small punctures, no very large pores being present. Palpi 4-segmented, rather long, first segment not much larger than second.

Mesonotum clothed with small hairs which are rather uniformly distributed, not arranged in definite stripes; integument not or scarcely shining. Legs with the vestiture composed entirely of hairs, no definite scales even on tarsi. Empodium broad, hairy beneath and as long as claws, usually conspicuous by its whiteness by reflected light. Claws usually with a few microscopic serrations or striations on one side near middle. Last segment of front tarsi of ♀ never much enlarged, but usually appearing darker than the rest. Wings rather densely hairy over the whole surface and rather broad. *R1* several times as long as *Rs*, the latter not very oblique; costa almost reaching tip of *M*; *Cu2* straight and ending rather abruptly well before the wing-margin. Abdomen of ♂: Tergites 5-8 all reduced to narrow strips, so that the end of the abdomen tends to contract and the hypopygium to turn upwards or forwards. Ninth tergite also mainly membranous, the only sclerotised portion being a continuous narrow strip on the posterior border; anal segment small, hidden under ninth tergite, without definite sclerotised parts; coxites short, more or less extensively fused at base beneath; style hairy, without spine at tip; roots of coxites (*rc*) united to form a semi-circular loop; tegmen almost divided into two parts, each with a rather complex process; genital rod large and capitate. Abdomen of ♀ not very extensile; only one spermatheca present, this being large and disc-shaped with darkened margin (the shape is apparently natural and not due to collapse in the mounting medium, as none of the very numerous specimens examined shows a spherical spermatheca); tergites 2-4 (or at least 2 and 3) divided in the middle.

The divided eyes and cup-like sensoria of the female together provide the main distinctions of *Campylomyza* s.str. from other genera of the tribe. No other genus has similar sensoria, unless *Urosema* Kieff. is to be regarded as distinct; I have included it only as a doubtful synonym because Kieffer emphasises the densely hairy ovipositor, no *Campylomyza* known to me shows this structure.

The species of this genus are rather numerous, and several of them appear to be very abundant and widely distributed. Specific characters, however, are difficult to appreciate, and a great deal more study is needed before the genus can be properly understood; it may be that here, as in many other genera of CECIDOMYIIDAE, morphological features will be found to distinguish the species less clearly than habits and life-history.

Amongst the British material examined (almost entirely consisting of captured specimens) I believe I can distinguish at least eight or ten species, but several of these (e.g. *C. flavipes*, *fuscipes*, *bicolor*, *pumila*) seem to grade into one another, and individual variation is certainly considerable. By analogy with the PSYCHODIDAE (as recently studied by Tonnoir) one might have expected the form of the tip of the antenna of the female to be constant for each species, but apparently it is not always so here; the length of the neck of the penultimate segment of the male antenna is one of the few features which has been relied on for differentiation, but this also varies a good deal individually as well as specifically, and the same is true of the relative lengths of the last two segments of the palpi. The variation in antennal structure seems to be to some extent correlated with size, small specimens tending to have shorter necks to the segments and in the case of females one or two fewer segments; it is doubtless also true that size is to some extent a character of the species. The colour of the legs and abdomen may help in distinguishing some species, but too much reliance should not be placed on these features, as immature specimens are always paler and those taken in winter or early spring may tend to be darker.

Differences between the species in male hypopygial structure are in some cases well marked, but in others very slight. In comparing hypopygia it should be noted not only that the parts may appear very different in different positions of the whole organ, but also that the aedeagus may occupy two different (more or less fixed) positions relatively to the other parts (these two positions are shown for *C. flavipes* in fig. 8, n. o, and for *C. bicolor* in fig. 9, u).

In addition to the species discussed below, the following European types belong to *Campylomyza* s.str., but cannot be precisely identified: *C. luculenta* Mg., *pallipes* Zett., *squalida* Winn., *vittata* Winn.

C. flavipes Mg. (fig. 8).

C. aceris Mg.; *C. aequalis* Winn.; *Prionellus minor* Kieff.?

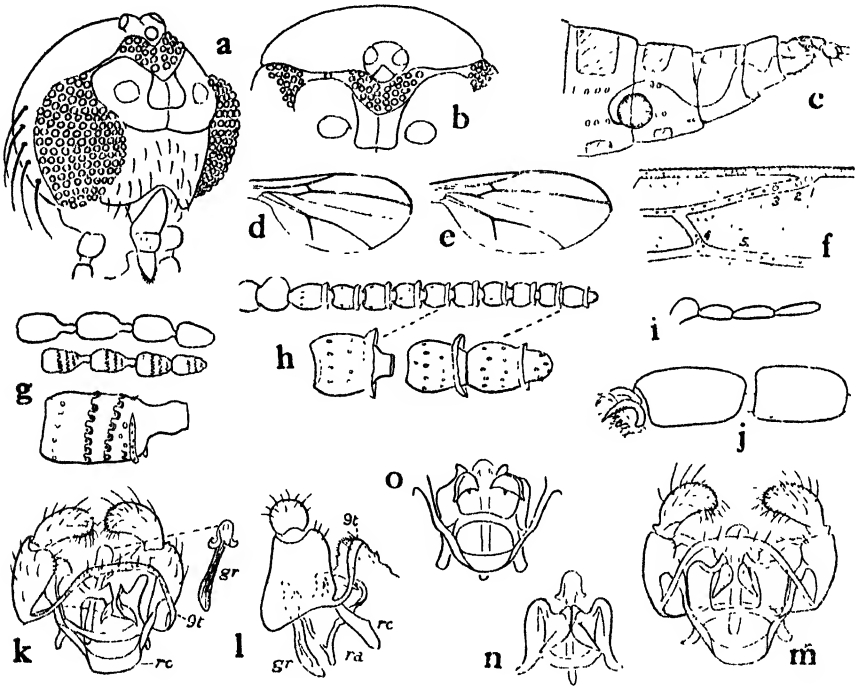
Thorax and abdomen mainly dark, membranous parts light reddish; legs mainly yellow, femora in ♀ and sometimes in ♂ darkened; halteres yellow. Antennae of ♂ with necks of flagellar segments short, barely half as long as the basal portion, neck of penultimate segment usually entirely lacking but sometimes present (at most as long as broad). Antennae of ♀ with 2 + 10 segments, intermediate segments very little longer than broad and with short necks, penultimate segment as in ♂ devoid of neck; collars not very deep; terminal segment with collar beyond middle, distal part smaller. Palpi with fourth segment somewhat longer than third. Fifth tarsal segment of ♀ slightly longer but not much thicker than fourth; claws with about four minute teeth. Hypopygium: Coxites not distinctly lobed, broadly fused at base ventrally; style small, bluntly rounded at tip, scarcely curved; ends of tegminal processes leaf-like. Wing-length, ♂ 1.2 mm., ♀ 1.5 mm.

This species, the genotype of *Campylomyza*, is fairly easily distinguished from its congeners by its small size and antennal structure in both sexes. Numerous specimens examined from various localities in Herts., Beds., Oxon.

C. fuscipes Mg.

In my paper quoted above I suggested that this species should be placed as a synonym of *flavipes* because the type has a hypopygium apparently identical with that of *flavipes*, but as Meigen emphasised the dark legs it may be preferable to use his name *fuscipes* for a form which is indeed extremely similar to *flavipes* but differs as follows:—

Size rather larger; wing-length of ♂ 1.4–1.7, ♀ 2–2.3 mm. Legs of ♂ with femora and tibiae rather dark, ♀ more so. Antenna of ♂ with a short neck (rather longer than broad) to penultimate segment; antenna of ♀ with last (tenth flagellar) segment longer than in *flavipes*, constricted in middle. Hypopygium practically as in *flavipes*, but coxites perhaps relatively smaller.



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FIG. 8.—*Campylomyza flavipes* Mg. a, head, half side view, to show form of eyes; b, eye-bridge from above; c, tip of ♀ abdomen; d, e, wings of ♂ and ♀; f, part of wing enlarged to show pores; g, tip of ♂ antenna (two variations), with single segment enlarged; h, antenna of ♀; i, palp; j, tip of front tarsus of ♀; k, l, hypopygium of ♂ from above and from side (Letchworth); m, hypopygium of ♂, var. (Sidmouth); n, o, aedeagus in two different positions.

Specimens examined from Herts. (Letchworth, Todd's Green); Beds. (Whipsnade); Glos. (Chedworth), Somerset (Castle Naroche, ♂♀ in cop.); Devon (Clovelly). This form seems intermediate between *flavipes* and *bicolor*.

C. bicolor Mg.

Prionellus pini Kieff. ?; *Cylophora fasciata* Kieff. ?

I propose to use Meigen's name *bicolor* for a form with the following characters :—

Larger and darker than *flavipes* or *fuscipes*; wing-length in ♂ about 1.7–2 mm., ♀ about 2.5 mm. Antenna of ♂ with necks of flagellar segments longer, that of penultimate segment about twice as long as broad. Hypopygium of ♂ differing slightly from *flavipes* or *fuscipes* in shape of style, which is somewhat curved, with the tip more hairy and pointed. Antenna of ♀ (if correctly associated with ♂) longer than in *flavipes* or *fuscipes*, last (tenth) flagellar segment long but not much constricted in middle. Last tarsal segment of ♀ not swollen.

Numerous ♂♂ examined from Herts. (Baldock, Weston, Hitch Wood), Oxon (Oxford).

This species fits Kieffer's description and figures of *Prionellus pini* (genotype of *Prionellus*) better than any other known to me. Except that the claws are described as simple (probably owing to Kieffer having overlooked minute serrations) the description of *Cylophora fasciata* might also apply to the female of this species; in any case it must be one of this group.

C. pumila Winn.

C. analis Winn.; *C. vivida* Winn.; *C. munda* Winn. ?; *Monardia seaci* Barnes.

A blackish species with dark legs; closely resembles *bicolor* as identified above, differing most obviously in the longer necks of the flagellar segments of the ♂, that of the penultimate segment being about two-thirds as long as the basal part. Antenna of ♀ with 2 + 11 segments, the last two well separated (at least in some specimens). Last front tarsal segment of ♀ not swollen. Hypopygium of ♂ not differing very obviously from *bicolor*.

Numerous specimens examined from Herts. (Letchworth, Todd's Green); Oxford; Cambs. (Cambridge, Newmarket); Devon (Sidmouth).

Winnertz's type males of *pumila*, *analis* and *vivida* show no appreciable differences in antenna or hypopygium and are almost certainly conspecific; the type male of *seaci* is also quite similar. *C. munda* was described from the female only, but I have little doubt it belongs here. The species, moreover, is doubtfully distinct from *bicolor*.

C. strobli (Kieff.).

Prionellus strobli Kieff.

Kieffer's type ♀, which I have examined, evidently belongs to a species closely related to *pumila*; it may actually be the same, but a possible specific difference is that the last tarsal segment of the front and middle legs is rather distinctly swollen (fig. 9, c). The antennae of the type are broken; the first few segments are quite half as long again as broad, with deep and somewhat irregular collars.

A ♀ closely resembling Kieffer's type was taken paired with a ♂ at Dunham, Lancs., by Mr. H. Britten, 14.ii.1920. The following diagnosis is drawn up from this pair :

Dark species with blackish legs. Wing-length ♂ 2 mm., ♀ 2.8 mm. Antenna of ♂ with fairly long neck to penultimate segment (fig. 9, f), but not quite so long as in typical

pumila. Antenna of ♀ (fig. 9, m) with 2 + 11 segments. Palpi of ♂ with fourth segment about half as long again as third, of ♀ nearly twice as long. Hypopygium (fig. 9, q) much as in *pumila* but processes of tegmen appear rather differently shaped in the mount. Venation about as in *pumila*, but wings rather broader at base, especially in ♀.

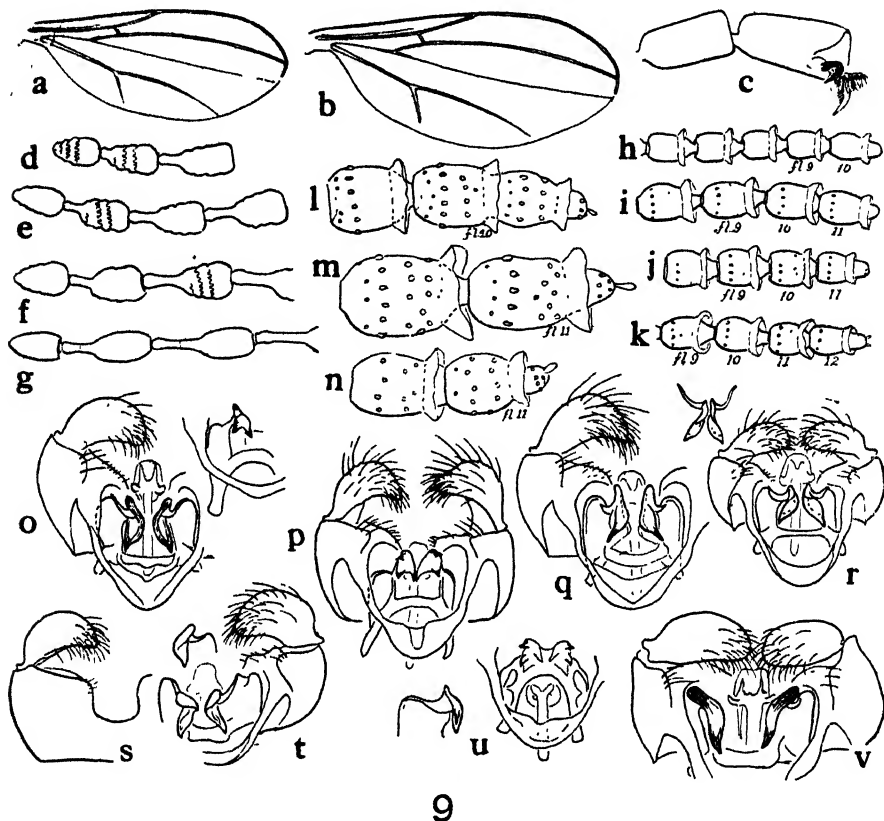


FIG. 9.—British *Campylomyza* (mostly to scale of corresponding parts in fig. 8). a, b, wings of ♂ and ♀, *pumila*; c, tip of front tarsus of ♀, Kieffer's type of *strobli*. d-g, tip of ♂ antenna: d, *fuscipes* (Weston); e, *bicolor* (Baldock); f, *strobli* (Dunham); g, *pumila* (Barnes' type of *seaci*). h-n, tip of ♀ antenna: h, *bicolor*? (Weston); i, m, *strobli* (Dunham); j, k, *pumila*?, two variations (Letchworth); l, *fuscipes*? (Castle Naroch); n, *pumila* (Oxford). o-v, hypopygia of ♂, mostly dorsal view with ninth tergite removed: o, *pumila*, tegmen in two different positions, same specimen (Oxford); p, *bicolor* (♂ in Meigen's collection); q, *strobli* (Dunham); r, *fuscipes* (Letchworth); s, *pumila*, ventral view of coxite and style (Barnes' type of *seaci*); t, *pumila* (Winnertz's type); u, *bicolor*, tegminal processes in two positions, same specimen (Oxford); v, *flavicoxa* (Winnertz's type).

C. flavicoxa Winn.

The type resembles *pumila*, notably in having a long neck to the penultimate antennal segment, but the hypopygium differs slightly (fig. 9, v) and the legs are entirely yellowish, including the coxae. A specimen taken by me at Ivinghoe

Common, Bucks., 3.x.37, has a very similar hypopygium, though its legs are not so pale. These specimens may represent slight variations of *pumila*, or possibly another allied species.

Campylomyza sp. indet.

A ♂ taken by me at Sherrard's Wood, Welwyn, Herts., 22.x.1936, has antennae similar to *pumila* but is smaller (wing-length 1.6 mm.) and the hypopygium (fig. 10, l) seems to show rather definite differences from *pumila* and related species. Having only one specimen I refrain from naming it. A specimen taken under a yew-tree at Low Wood, N. Lancs., 20.v.38, has a similar hypopygium but the penultimate antennal segment has a very short neck; this may represent still another species.

C. fusca Winn.

C. obscura Winn. ♀?; *Monardia populi* Felt.

A dark species with almost entirely blackish thorax and legs, pale halteres and reddish abdominal membrane, rather closely resembling *bicolor* and *pumila*. Penultimate segment of ♂ antenna with a moderately long neck, usually about half as long as the basal portion but sometimes shorter, in one very small specimen practically absent. Antenna of one ♀ taken in copula with 2 + 11 segments, the terminal segment constricted in middle and with two sensorial cups; other ♀♀ taken in company with ♂♂ (but not paired) show variation in the antennae, the last being only as long as the penultimate and sometimes connate with it; in all cases the antennal segments are shaped as in *bicolor*, being about half as long again as broad and with short necks. Claws with several fine serrations as in *flavipes* and *bicolor*; last tarsal segment of ♀ about equal to the fourth in length and thickness.

Hypopygium of ♂ (fig. 10, s) differing rather conspicuously from *flavipes*, *bicolor* and related species in having the coxites separated almost to base ventrally and with a small rounded dorsal apical lobe fringed with hair; style also differing in having long erect hair on the inner surface as well as at the tip, and probably on this account it is normally held directed straight backwards instead of being infolded as is usually the case in the *flavipes* group; tegmen (fig. 10, t) of very characteristic form, quite different from that of the *flavipes* group. Wing-length, ♂ 1.2–1.8, ♀ 2–2.3 mm.

Numerous specimens examined from Herts. (Hitchin, Baldock, Breachwood Green, Todd's Green) and Beds. (Whipsnade).

Felt's photograph of the hypopygium leaves little room for doubt that this species also occurs in North America under the name *Monardia populi* Felt.

C. furva sp. n.

A dark species with blackish legs and even the halteres more or less smoky at base; very similar to *bicolor* and *fusca*.

♂. Antennae with short neck to penultimate segment, usually about one-third as long as basal portion, but may be even shorter. Palpi with third segment barely twice as long as broad, fourth nearly twice as long as third. Hypopygium (fig. 10, o) resembling that of *fusca* in having the coxites united to only a small extent at base beneath and style with many longish hairs on inner surface, but tegmen quite different, more resembling that of *ormerodi*; dorsal apical margin of coxite rounded, not forming a very definite lobe; style in most specimens infolded. Claws perhaps with the serrations fewer and finer, and empodium perhaps narrower than in the *flavipes* group. Wing-length 1.4–1.7 mm.

♀. Not certainly identified; a single specimen taken in company with a ♂ (but not paired) has antenna with 2 + 10 or 2 + 11 segments (the last segment divided on one antenna, not on the other), in shape resembling *bicolor* or *fusca*; fourth front tarsal segment short, fifth distinctly longer and thicker than fourth. Wing-length just under 2 mm.

Herts.: Breachwood Green, 3.v.36, ♂ (type); Todd's Green, 4.v.38, 7 ♂♂; Fisher's Green, 4.v.38, 1 ♂, 1 ♀. All taken at edges of oak woods.

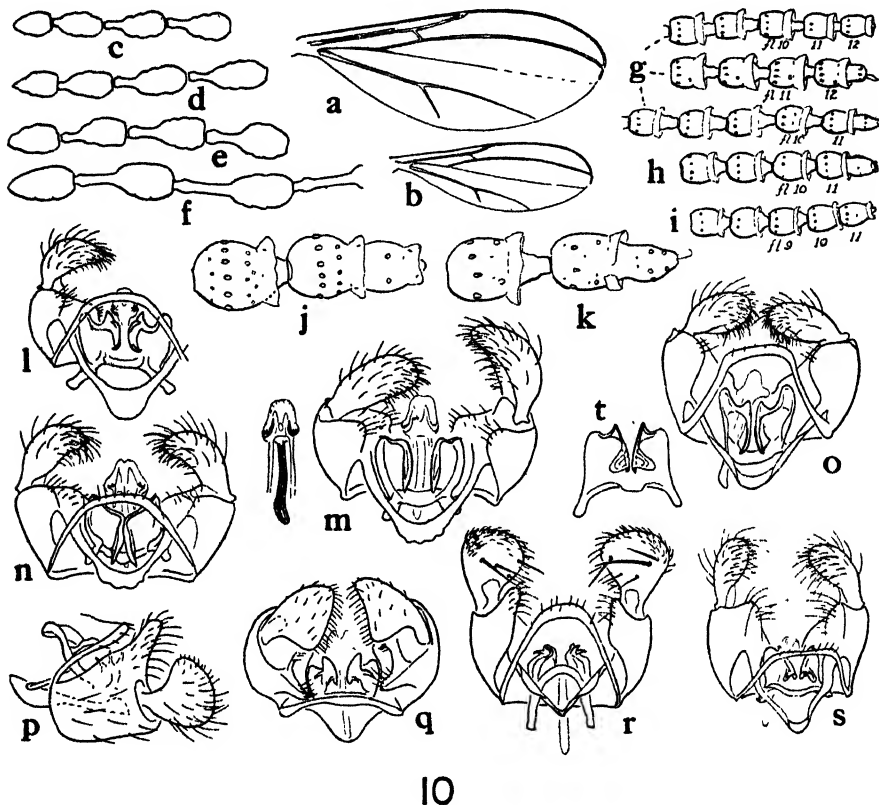


FIG. 10.—British *Campylomyza*. a, b. wings of *ormerodi*: a, large ♂; b, small ♂. c-f. tips of ♂ antenna: c, *furva*; d, *fusca*; e, *lobata*; f, *ormerodi*. g-k. tips of ♀ antenna: g, k, *ormerodi*, three variations (Ivinghoe, Sidmouth, Harpenden); h, j, *fusca*; i, *lobata*. l-s, hypopygia of ♂, mostly complete, dorsal view: l, sp. indet. (Welwyn); m, *ormerodi* (Radwell; tergite removed, genital rod shown separately); n, *ormerodi*, var. (Welwyn); o, *furva* (Breachwood Green); p-r, *lobata*, side, end, and dorsal views; s, *fusca*. t, tegmen of *fusca* to larger scale.

C. ormerodi (Kieff.).

Amblyspatha ormerodi Kieff., ♂.

♂. Very like *pumila*; necks of flagellar segments even longer than in that species, on penultimate segment almost as long as the basal part. Palpi rather short, last two segments subequal in length. Claws with the fine serrations fewer than in the other species (2-3 at most). Wings (at least in the specimens examined) with cubital fork more acute

than in *flavipes*, *bicolor* and related species; wing in a small specimen 1.5 mm., in a large one 2.2 mm. long, the small specimen (fig. 10, b) having the wing narrower than the large (fig. 10, a) one and with *R*1 shorter (only about twice as long as *r-m*). Hypopygium (fig. 10, m, n) of similar type to that of *pumila* but with quite different tegmen, somewhat resembling that of *furva*; structure identical in the large and small specimens.

♀. Size variable, wing 2-3 mm. Colour dark, usually including legs, but halteres pale. Antennae (fig. 10, g) differing from those of all the species discussed above in having very distinct necks to the segments; flagellum with 11 or 12 segments, in the former case the terminal segment is long with narrower distal portion, in the latter the terminal segment may be small or (as in the case of Winnertz's type of *picea* and in one of several specimens from Sidmouth) larger, with a nipple-like tip simulating a small 13th segment (fig. 10, g, middle figure). Palpi and claws as in ♂; one abnormal ♀ has 3-segmented palpi, the last two being fused. Fifth tarsal segment rather longer than fourth.

Herts.: Harpenden (*W. E. Hodson*), a short series bred from larvae attacking clover roots (including the large and small ♂♂ mentioned above); Letchworth, Radwell and Welwyn, ♂♂ ♀♀ captured. Bucks.: Ivinghoe, ♀ captured. Devon: Sidmouth, several ♀♀ captured on window of beach shelter. Brecon: Crickhowell, 1 ♀ captured.

Winnertz's type ♀ of *C. picea* appears to me to belong to the same species as the one described above, but I hesitate to adopt his name because of the difference in life-history: *ormerodi* according to MacDougall is a widespread pest of red clover, whereas the type of *picea* was reared from rotten wood (beech). It should be noted that Kieffer's description of the female *ormerodi* (added subsequently to the original publication) does not apply to the females reared by Mr. Hodson, but the latter are doubtless the true *ormerodi*. Unfortunately the types of *ormerodi* cannot be traced.

C. sylvicola Winn.

Winnertz's type female of *C. sylvicola* differs from *ormerodi* as described above in the following particulars: antennal flagellum 11-segmented, with necks rather longer than *ormerodi*, penultimate segment with short neck; terminal segment not much narrowed beyond the subapical cup, as long as penultimate. Legs entirely yellowish.

A ♀ agreeing with the type was taken by Mr. A. H. Hamm in the Oxford Museum, 24.x.1917; it may represent a species distinct from *ormerodi*.

C. lobata sp. n.

A small species much resembling *flavipes*, but with quite different hypopygium. Colour apparently variable; in old (possibly immature or faded) specimens the legs of both sexes and abdomen of ♀ are yellowish, in recently collected specimens very much darker.

♂. Penultimate segment of antenna with neck about half as long as basal part (fig. 10, e). Hypopygium (fig. 10, p-r) differing remarkably from other British species in having the coxites produced apically into a rather long thumb-like lobe; ventrally the coxites are united to only a small extent; styles broader than in the other species with apical margin rather truncate and fringed with numerous short hairs; inner surface with a few bristly hairs. Wing-length 1.2-1.5 mm.

♀. Flagellar segments somewhat longer than in *flavipes* but shorter (relatively to their breadth) than in *pumila*; cups very shallow, especially on one side, where they may be reduced to a narrow strip, though the ring is not interrupted; necks very short; ninth seg-

ment with still shorter but distinguishable neck; tenth longer, usually with postmedian cup only but sometimes with a small apical cup, distal part of segment in one or two specimens (rather doubtfully referable to this species; see fig. 10, i) as large as basal part and separated to form an eleventh segment. Last two front tarsal segments short, subequal in length and thickness. Wing-length barely 2 mm.

HERTS.: Breachwood Green, 3.v.36, 6 ♂♂ (including type), 2 ♀♀; Todd's Green, 4.v.38, 2 ♀♀. BEDS.: Whipsnade, 8.iv.38 (*F. W. E.*). LONDON: Kensington, on windows of British Museum (Natural History), 8.x.91, 4 ♂♂, 6 ♀♀ (*E. E. Austen*). ANGUS: Breadownie, vii.37, 1 ♂ (*R. L. Coe*).

This species is evidently common and widely distributed, but the male does not appear to have been described before; Winnertz's type ♀ of *C. vittata* is not unlike those described above, but as I am not quite certain that the females described above belong with the males, and as in any case the identity of the type of *vittata* is uncertain, I have not adopted this name.

TWO NEW SPECIES OF ALEURODIDAE FOUND ON FERNS IN GREENHOUSES IN BRITAIN (HEMIPTERA)

By K. N. TREHAN, M.Sc., Ph.D., F.R.E.S.

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IN 1891, Douglas (*Ent. mon. Mag.* 27 : 44) gave a description of an Aleurodid found on ferns at Kew Gardens and identified it as *Aleurodes filicium* Goldi. Douglas's material is still preserved in the British Museum (Natural History) and through the kindness of Mr. F. Laing, I have been able to examine it. There are quite important structural differences between Douglas's specimens and Goldi's original description (1886, *Mitt. schweiz. ent. Ges.* 7 : 247) which were kindly verified by Mr. Laing. Many of Goldi's type specimens are in the Naturhistorisches Museum, at Bern, but the Director there has informed us that no trace can be found of *A. filicium*; so that it has not been possible to make an actual comparison of the specimens.

In the autumn of 1937, I made a close examination of the species of ferns in the fern house at Kew but failed to discover Douglas's species. On the other hand, two other species were found both of which appear to be undescribed.

The first of them described below as *Aleuroplatus kewensis* resembles more or less that described by Goldi as *A. filicium*, but differs sufficiently to make it certain that it is not the same species.

Baker and Moles (1921, *Rev. Chil. Hist. nat.* 25) remarked under *A. filicium* "specimens of *extranius* studied by Quaintance and Baker show the two to be alike, only in *extranius* the five spines are on the dorsal surface . . . but the same thing was described by Douglas in 1890 and because of the statements of these two describers they retained the two specific names." Laing considers *extranius* as a printer's error which probably means *extraniens* described by Bemis (1904, *Proc. U.S. nat. Mus.* 27 : 526).

In view of the differences noted in all the immature stages from the original description of *A. extraniens*, the present species is considered distinct.

The second species described below as *Trialeurodes williamsi* is identical with specimens found on ferns in 1914–1915 at the Royal Horticultural Society's Gardens at Wisley, Surrey, by Dr. C. B. Williams, who has been kind enough to permit me to use his material.

The material for the present study was obtained from the Royal Botanic Gardens, Kew. For descriptive purposes the respective stages were obtained from the insects reared under observation and mounted in Berlese's fluid. For the study of the genitalia and finer details the specimens were treated with 10% KOH solution and then neutralised in 2% solution of acetic acid in 90% alcohol and ultimately mounted in balsam.

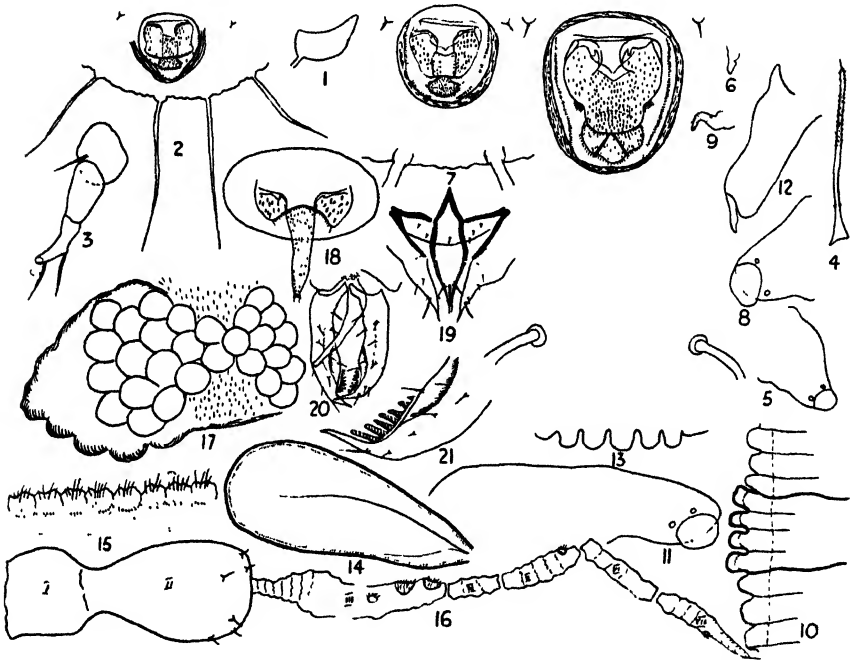
The assistance of Dr. C. B. Williams and Mr. F. Laing is gratefully acknowledged, and the facilities provided by the Director of the Royal Botanic Gardens, Kew, and his staff for the collection of the material and the encouragement by the Indian Central Cotton Committee by the grant of a foreign scholarship are highly appreciated.

***Aleuroplatus kewensis* sp. n. (figs. 1–21).**

Egg (fig. 1). Curved and almost crescentic when lying on the leaf—the concavity directed outwards, narrower at the ends; pedunculate, the stalk inserted well removed from the basal end, often slightly erect in position; yellowish-white when fresh, subsequently turning to brownish and ultimately to shining orange; two pairs of red eye-spots visible before hatching. Length 0.200–0.234 mm.; breadth 0.096–0.110 mm.; average measurements 0.220×0.107 mm.; stalk 0.035 mm. long. Laid singly over the underside of the leaves. *Nymph 1st instar*. Elliptical, brownish when hatched, tending to dark brown later, slightly convex in the middle; margins almost entire with a waxy fringe all round and beset with nine (occasionally ten) pairs of bristles—two or sometimes three cephalic, five thoracic and two caudal. Abdominal segments devoid of marginal spines and no bristle between the anal and the caudo-lateral (fig. 2). Length 0.270–0.293 mm.; breadth 0.144–0.165 mm., average measurements 0.286×0.153 mm. Four pairs of dorsal spines (occasionally five pairs), one antennal, very much developed, long, brown and directed backwards like whiskers, two thoracic and one cephalad to vasiform orifice, all minute; two pairs of minute ventral spines, one at the region of the rostrum and the other at the level of the vasiform orifice; either one or both of these may be developed. Eyes comparatively large, undivided or constricted; legs (fig. 3) functional, three segmented; antennae long, concolorous with the body, two segmented, the basal segment triangular, wider at the base; the distal segment filamentous, slightly hairy and ending in a spine at the tip (fig. 4); average length 0.070 mm. Vasiform orifice (fig. 2) somewhat pear-shaped, with the caudal extremity narrower, inner lateral and caudal margins thickened, average measurements 0.023×0.024 mm.; operculum rectangular, more than half filling the orifice, caudal margin profusely hairy, average measurements 0.014×0.016 mm.; lingula relatively small, about 0.011 mm. long, knobbed at the end, setose and slightly exposed beyond the operculum. *Nymph 2nd instar*. Generally oblong, the anterior margin may be narrower, greenish-yellow, margin slightly crenulate, thoracic tracheal folds evident and their endings marked by a comb of a few teeth. Abdominal and thoracic segmentations obvious. Marginal spines three pairs—one cephalic, minute and disposed laterally, one caudo-lateral, minute and a well-developed anal spine; four pairs of dorsal spines—one antennal, two thoracic and one vasiform, variable in size and presenting all gradations between a well-developed and minute form, occasionally asymmetry also noticeable, ventral spines absent or 2 or 3 pairs in the rostral and vasiform

region. Average measurements 0.410×0.238 mm. Legs degenerate as usual, conical stumps ending in circular discs (fig. 5); eyes distinct, entire; antennae extremely reduced, apparently two segmented, directed backward, about 0.010 mm. long (fig. 6). Vasiform orifice almost circular (fig. 7), inner lateral and caudal margins thickened with a nearly continuous row of striations running interiorly, average measurements 0.036×0.035 mm.; operculum almost similar in form, about as long as wide and filling roughly $\frac{2}{3}$ of the orifice, caudal margin with minute hairs, average measurements 0.020×0.020 mm.; lingula short, thick and stout, setose, almost inverted, half opened, mushroom-shaped, head profusely spinous, length about 0.014 mm. and only a little of the head exposed beyond the operculum. *Nymph 3rd instar.* Shape, colour and structure with marginal spines corresponding to those in the previous instar. Dorsal spines minute, a pair near the base of antennae and another cephalad to orifice; a single pair of ventral spines in the region of the orifice, measurements about 0.648×0.379 mm. Legs (fig. 8) and eyes as in the previous instar, antennae characteristic of the stage, much atrophied, directed inward and hooked at the tip (fig. 9). Vasiform orifice sub-circular, structure similar to that in the previous instar, measurements 0.045×0.041 mm.; operculum cup-shaped in outline, broader cephalic and narrower caudal margin, notched postero-laterally, anterior margin shifted from that of the orifice, measurements 0.028×0.028 mm., more than half filling the orifice; lingula as in the previous instar, setose and with a pair of brittle bristles at the tip, length 0.024 mm. *Pupa.* Elliptical, occasionally margin notched by the presence of the hairs on the leaf, yellow, convex dorsally, margins dentate with a narrow waxy fringe binding it to the leaf. Dorsum shagreened, submarginal area not distinct from the dorsal disc, and traversed by transverse striations. The mid-dorsal line in the cephalic and thoracic region slightly raised into a low keel. Abdominal segmentation distinct, the median line arched, on each side concolorous squarish designs demarcating the shagreened surface. Tracheal folds ending in a comb of about four teeth (fig. 10). Marginal spines minute, one or two pairs: cephalic, the spines disposed laterally, and a caudo-lateral; dorsal spines variable in number as well as in their development, three or five pairs, one antennal, two thoracic, one cephalad to vasiform orifice and one submarginal anal; the thoracic pairs may be absent, the submarginal anals are invariably well developed and setaceous and the other pairs may be minute or very well developed, probably according to the hairy nature of the host plant; ventral spines only a pair in the region of the orifice. Length 0.828–1.03 mm., breadth 0.486–0.648 mm., average measurements 0.952×0.567 mm. Legs curved, longer than in the previous instars (fig. 11); antennae developed, directed backward and outward and ending in a minute process, average length 0.066 mm. (fig. 12); eyes conspicuous. Vasiform orifice elevated and bounded by brown edges, general shape and structure corresponding to that in the previous instar and the inner row of striations very prominent (fig. 13), average measurements 0.061×0.055 mm.; operculum relatively large, extending almost to $\frac{3}{4}$ of the orifice with a prominent notch on either of the postero-lateral margins, nearly as long as broad, average measurements 0.034×0.036 mm.; lingula about 0.029 mm. stout, inverted, half opened, mushroom-shaped, head profusely ornamented with spines and protruded beyond the operculum. *Adult* (♀). Length 0.900–1.12 mm., body flaccid, yellow throughout, the wax plates slightly whitish. Wings pale, spotless, marginal veins yellow, the outer one shining and dentate (fig. 15); fore-wing about 1.01 mm. long, venation (fig. 14) radial sector and a faint cubitus; wing expanse about 2.34 mm. Antennae concolorous with the body, filiform, seven segmented (fig. 16) (see table for measurements), Segment I nearly square, II subpyriform, very prominent, III longest of all, narrow and imbricate towards the base, a little constricted in the middle and beset with sensoria distally, IV smallest of all, only 2.5 times longer than broad, imbricate, V slightly clavate, imbricate and beset with one sensorium towards the distal extremity, VI cylindrical and imbricate, VII elongate, tapering distally and terminating in a fine spine, a little hairy

towards the distal half and provided with a sensorium. Hinder legs longer than others, average measurements, tibia 0.357 mm. long; tarsus—proximal segment 0.108 mm., distal segment 0.087 mm.; tibia of front leg 0.215 mm.; tarsus—proximal segment 0.087 mm., distal segment 0.078 mm.; paronychium acute. Eyes characteristic, constricted and subpyriform, upper portion small and light in colour, lower darker and bulging out prominently, facets of either division running into the other; in prepared specimens margins thick and deeply coloured (fig. 17). Tip of rostrum dark brown.



FIGS. 1-21.—*Aleuroplatus kewensis*.—1. Egg; 2. caudal margin and vasiform orifice—1st instar nymph; 3. leg of 1st instar nymph; 4. antenna of 1st instar nymph; 5. leg of 2nd instar nymph; 6. antenna of 2nd instar nymph; 7. vasiform orifice of 2nd instar nymph; 8. leg of 3rd instar nymph; 9. antenna of 3rd instar nymph; 10. thoracic tracheal fold of pupa; 11. leg of pupa; 12. antenna of pupa; 13. vasiform orifice of pupa; 14. fore-wing of adult; 15. margin of the fore-wing; 16. antenna of female; 17. eye of the adult; 18. vasiform orifice of female; 19. female genitalia; 20. male genitalia; 21. tip of one paramere showing row of teeth.

All figures are $\times 360$ except fig. 1, $\times 37$; fig. 14, $\times 30$; and figs. 19, 20, $\times 135$.

Vasiform orifice transversely oval (fig. 18), average measurements 0.034×0.048 mm.; operculum broader than long, usually caudal margin curved inward, measurements 0.022×0.034 mm.; lingula long and narrow with a few hairs at the tip, length about 0.029 mm. Genitalia normal (fig. 19).

♂ (3) Concolorous with the ♀. Abdomen tapering posteriorly. 1st abdominal segment almost bead-like and distinct from the rest. Eyes bulging out and very prominent as in the ♀. Vasiform orifice similar to that of ♀ but the lingula relatively shorter. The genitalia conspicuously different and marked by the shape of the parameres, which end in a claw-shaped structure and are beset with a row of seven teeth towards their distal

inner surface (figs. 20 and 21). The teeth are almost blunt and gradually increase in size distally.

Described from many specimens of various stages. The type specimen which emerged on 27th January, 1938, from a pupa on *Nephrodium confluent* F. Mueller, and also a pupa from *Anemia* sp. collected from Royal Botanic Gardens, Kew, Surrey, 17th September, 1937, will be deposited in the British Museum (Natural History). Found on *Dryopteris flaccida*; *Diplazium proliferum*; *Nephrodium confluent*; *Anemia* sp. and *Oleandra africana*, etc., etc. Dates of capture from 20th August, 1937, to February 1938.

REMARKS.

(1) *a.* The following differences have been observed in Douglas's specimen of *A. filicium*: Margin sinuate with a parallel inner line which is more or less dentate; a series of small marginal spines, the anal pair long and very conspicuous. Vasiform orifice without an inner row of striations, lingula not prominently knobbed and entirely obscured by the operculum.

b. The following points of difference have been noticed in the description of *A. extraniens* by Bemis: Larva of 1st instar without a fringe of wax, marginal spines only two pairs—latero-cephalic and latero-caudal; antennae not visible. In the pupa, vertical, ventral secretion of wax, the lateral wax tubes distinct and bent downward; lingula with the distal portion rounded and the apex divided into two minute pointed lobes.

(2) This species is provisionally assigned to the genus *Aleuroplatus*. The characters of the pupa case in this species fall between the genera *Aleuroplatus* and *Asterochiton*, according to the key to genera and species by Quaintance and Baker (1917) and Baker and Moles (1921). As the vasiform orifice in the later genus is typically subcordate, the species under discussion differs from it. On the other hand, though the characters of this organ do not agree with those described in the type species of *Aleuroplatus*, they are practically identical with those in some species described by Quaintance and Baker (1917) so far as their shape is concerned.

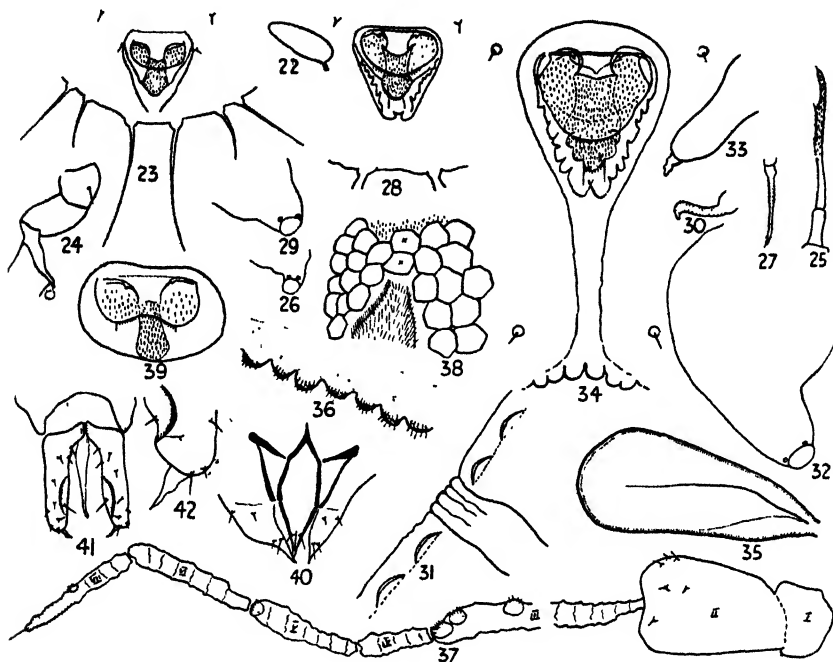
(3) Only a single male has been reared out from a large number of pupae under observation. Collections from Kew Gardens and emergences in the laboratory produced the females. Because of the predominance of the females in this species it is probable that reproduction may be primarily parthenogenetic. Occasionally females have been noticed with a considerable number of developed eggs in their abdomen even before emergence from the pupa, which indicates a probability of their laying soon after emergence.

Trialeurodes williamsi sp. n. (figs. 22–42).

Egg (fig. 22). Oblong, elongate and rounded at the extremities; pedunculate, the stalk inserted a little on one side of the basal end, lying almost horizontally on the leaf surface; colour greenish-yellow when fresh, subsequently changing to brown; two pairs of red eye-spots prominent before hatching. Length 0.172–0.207 mm.; breadth 0.072–0.082 mm.; average measurements 0.188×0.078 mm.; stalk 0.026 mm. Laid singly and scattered on the underside of the leaves. *Nymph 1st instar*. Oblong, greenish-yellow, flat; margin entire with a waxy fringe all round; marginal spines 17–18 pairs—three cephalic, the median and sublateral relatively better developed, eleven or twelve laterals

almost subequal, three caudals, the anal and the outer caudo-lateral better developed (fig. 23). Length 0.255–0.276 mm.; breadth 0.132–0.150 mm.; average measurements 0.264×0.138 mm. One or two pairs of extremely minute dorsal spines, one antennal and one cephalad to vasiform orifice; two or three pairs of ventral spines, one rostral and one or two in the region of the vasiform orifice which are generally better developed. Eyes relatively large, may be entire, constricted or even divided; legs (fig. 24) functional, three segmented; antennae long, brownish and three segmented, the basal segment short and flat, the 2nd cylindrical and the 3rd longest of all, slightly hairy distally and beset with two minute spines—one at the extremity and the other at a distance of about $\frac{2}{3}$ of its length, average length 0.070 mm. (fig. 25). Vasiform orifice almost triangular (fig. 23), approaching near the margin and open at the caudal end; inner lateral margins not thickened, floor with a ridge-like thickening, average measurements 0.025×0.025 mm.; operculum semicircular, average measurements 0.012×0.017 mm.; lingula long and spatulate, on an average 0.014 mm. long, setose, about $\frac{2}{3}$ exposed beyond the operculum. *Nymph 2nd instar*. Oblong, pale greenish-yellow, margins almost entire, abdominal segmentations marked by a series of circular areas on either side of the median line. Marginal spines three pairs—cephalic, caudo-lateral and anal in position; three pairs of minute dorsal spines—antennal, abdominal and vasiformal; ventrals absent or a pair in the region of the orifice; average measurements 0.366×0.196 mm. Legs degenerate (fig. 26) conical stumps with a disc at the tip; eyes entire; antennae atrophied, conspicuously long, apparently three segmented, the last one being the longest and a little hairy, directed backward and on an average, 0.032 mm. long (fig. 27). Vasiform orifice subcordate, deeply notched in the caudal margin (fig. 28), average measurements 0.032×0.031 mm.; operculum transversely elliptical, almost semicircular in shape, about half as much broader than long and half filling the orifice, average measurements 0.016×0.023 mm.; lingula long, thick and spatulate, average length 0.017 mm. and half exposed beyond the operculum. *Nymph 3rd instar*. Corresponds to the previous instar in shape and colour, thoracic tracheal folds indicated by three small teeth at the margin, abdominal and thoracic segmentations obvious, the former marked by circular areas. Distribution of the various spines corresponds to that in the previous instar, average measurements 0.508×0.300 mm. Legs (fig. 29) and eyes as in the previous instar, slightly enlarged; antennae characteristic of the stage (fig. 30), much atrophied and directed inward, hooked at the tip and slightly hairy, average length 0.022 mm. Shape of the vasiform orifice corresponds to that in the previous stage, inner lateral margins ridged, average measurements 0.043×0.036 mm.; operculum similar to that in the previous stage, average measurements 0.023×0.030 mm.; lingula spatulate, lobed distally and armed with a pair of bristles at the tip, about 0.024 mm. long and half exposed. *Pupa*. Elliptical, elongate and narrower at the extremities, greenish-yellow, slightly raised and enclosed within a surrounding wall of wax; dorsum lightly dimpled, convex medially, flatter laterally. Submarginal area narrow, not separated from dorsal disc which is traversed by striations. A series of 26–32 pairs of crescent-shaped submarginal papillae from which arise long tape-like structures of wax, a pair at each extremity is relatively longer and more prominent than the others which are almost subequal; these tapes are slightly arched and often rest on the leaf surface. Abdominal and thoracic segmentation obvious; tracheal folds evident, ending at the margin in a comb of 3–4 teeth (fig. 31). Average measurements 0.783×0.457 mm. Legs curved and longer than in the previous instars (fig. 32); antennae better developed, directed backward and outward and ending in a minute process (fig. 33), average length 0.044 mm. Eyes conspicuous, often constricted. Vasiform orifice subcordate, extending posteriorly in a deep furrow to the caudal margin, inner lateral margins toothed and the thickened sides meeting caudad, average measurements 0.065×0.055 mm. (fig. 34); operculum about half as broad again as long, caudal margin hairy, about half filling the orifice, average measurements 0.030×0.042 mm.;

lingula long and spatulate, distally seven lobes prominent, three on either side and one median, setose, armed with a pair of prominent bristles at the tip, length 0.035 mm. and $\frac{1}{4}$ of the lobed area exposed.



FIGS. 22-42.—*Trialeurodes williamsi*.—22. Egg; 23. caudal margin and vasiform orifice—1st instar nymph; 24. leg of 1st instar nymph; 25. antenna of 1st instar nymph; 26. leg of 2nd instar nymph; 27. antenna of 2nd instar nymph; 28. vasiform orifice of 2nd instar nymph; 29. leg of 3rd instar nymph; 30. antenna of 3rd instar nymph; 31. thoracic tracheal fold of pupa; 32. leg of pupa; 33. antenna of pupa; 34. vasiform orifice of pupa; 35. fore-wing of adult; 36. margin of the fore-wing; 37. antenna of female; 38. eye of the adult; 39. vasiform orifice of female; 40. female genitalia; 41. male genitalia; 42. tip of one paramere.

All figures are $\times 360$ except fig. 1, $\times 37$; fig. 35, $\times 30$; and figs. 40, 41, $\times 135$.

Adult (♀). Length 0.945–1.07 mm.; body flaccid, whitish, tending towards pale at the sides and distal part of legs. Wings white, spotless, marginal veins yellow, shining and dentate (fig. 36); fore-wing about 1.01 mm. long, venation—radial sector and a faint cubitus (fig. 35); wing expanse about 2.22 mm. Antennae concolorous with the body, filiform and seven segmented (fig. 37) (see table for measurements), segment I subglobose, II subpyriform, very prominent, III longest of all, narrow and imbricate towards the base, relatively narrower in the middle and beset with sensoria distally, IV smallest of all, cylindrical and imbricate, V slightly clavate, imbricate and beset with a sensorium towards the distal end, VI cylindrical and imbricate, VII elongate, tapering distally and ending in a fine spine, slightly hairy towards the distal half and provided with a sensorium, segments V–VII subequal. Hindler legs longer than others, average measurements, tibia 0.334 mm. long; tarsus—proximal segment 0.092 mm., distal segment 0.094 mm.; tibia of front leg 0.222 mm.; tarsus—proximal segment 0.063 mm., distal segment 0.076 mm.;

paronychium acute. Eyes constricted, the two halves connected by a bridge of two facets in a longitudinal row (fig. 38), crimson red. Vasiform orifice transversely oval (fig. 39), average measurements 0.034×0.048 mm.; operculum much broader than long, subrectangular, about 0.014×0.034 mm.; lingula small, swollen at the tip, about 0.018 mm. long. Genitalia normal (fig. 40).

♂. Concolorous with the ♀, a little smaller in size. Vasiform orifice also similar to that of ♀. Genitalia (figs. 41, 42) with characteristic parameres, long and narrow, almost uniformly broad, rounded at the distal end and provided with a characteristic beak-like process, each half beset with about ten spines; aedeagus long and narrow, shape normal.

Described from many specimens of various stages. The type specimen which emerged on the 20th October, 1937, from a pupa on *Anemia* sp. and also a pupa on *Oleandra africana* collected from Kew Gardens on the 17th September, 1937, will be deposited in the British Museum (Natural History). Found on *Dryopteris flaccida*; *Diplazium proliferum*; *Nephrodium confluent*; *Anemia* sp. and *Oleandra africana* etc., etc. Dates of capture from 20th August, 1937, to February 1938.

REMARKS.

The genus to which this species is assigned is quite provisional. The characters of the pupa-case fall between *Aleuroparadoxus* and *Trialeurodes*. It is included in *Trialeurodes* because of the characteristic agreement in the general shape and the structure of the vasiform orifice of the pupa with that genus.

TABLE I.

Species	Sex	Average measurements of each segment in mm.							Total length (mm.)
		I	II	III	IV	V	VI	VII	
<i>Trialeurodes williamsi</i> .	♀	0.021	0.052	0.110	0.030	0.041	0.043	0.048	0.345
" "	♂	0.020	0.051	0.108	0.028	0.038	0.040	0.040	0.325
<i>Aleuroplatus kewensis</i> .	♀	0.024	0.061	0.137	0.017	0.027	0.033	0.036	0.335

ON *CILLENUS* SAMOUELLE (COLEOPTERA, CARABIDAE)

By H. E. ANDREWES, F.R.E.S.

Cillenus, treated during last century as a genus, has in recent years been reduced to the rank of a subgenus of *Bembidion*. Including Dupuis' *Armato-cillenus formosanus*, nine species are enumerated in Csiki's Catalogue, but one of these is a synonym. Descriptions of two other species have since appeared, and one new one is described here, making eleven in all. Some of these insects present unusual characters, and the authors who described them have evidently placed them in the group with hesitation. Nevertheless, it is not my intention to introduce a number of new subgeneric names, and all that is attempted here is to tabulate the species, and, as the original descriptions are scattered through numerous periodicals, some of them difficult of access, and as, moreover, many of them are inadequate, to add a fuller description of each. Although the material available is in some instances scanty, I have found it possible to examine most of the types; of one species, however, I have seen no example, viz. the recently described *C. tillyardi* Brookes from New Zealand, and here I can only reproduce the original description. I have to thank various correspondents for their help, viz. Mr. Arrow of the British Museum, Dr. W. Horn of the Deutsches Entomologisches Museum, Prof. O. de Beaux of the Genoa Civic Museum, and the Curator of the Macleay Museum in Sydney; special thanks are due to my friend Mr. H. J. Carter of Sydney, who obtained for me two specimens of one of the two Australian species, and presented me with an example of the other one from his own collection.

Features common to all the species of the group are the very wide head, not contracted behind, and almost as wide as the prothorax, the long, curved, powerful mandibles, and the wide marginal channels of the elytra. The body is usually impunctate and glabrous. The eyes are moderately prominent, the antennae rather short and sometimes moniliform, fully pubescent from segment 4, though the apical half of segment 3 and the apex of 2 are more or less setulose. The prothorax is nearly always strongly contracted behind, so that the base is narrower than the apex, its sides are bisetose, the front seta placed far forward, the basal sulcus is generally very deep, placed at some distance from the margin, between which and the sulcus a rudimentary border is sometimes present, and the hind angles are without carina. The elytra are variable in form and striation, the scutellary striole slight, the apical stria usually merging in the general striation; the border is sometimes rounded at shoulder, sometimes angulate, and does not extend inwards beyond stria 4; the apex is subtruncate, and more or less emarginate on each side; the number of dorsal pores varies from 2 to 4. All the species have an isodiametric microsculpture, generally a very distinct one. In the protarsi (♂) the two basal joints are usually dilated and outwardly produced, with a spine at the apex of the first segment.

So far as is known, all the species frequent the seashore, and are generally found far below high-water mark.

Key to the species.

- 1(14). Hind lateral seta of the prothorax placed on or near the hind angle; metepisterna long, narrow, and strongly contracted behind. Elytra flat, or only moderately convex, generally parallel-sided, with square shoulders, widest at or behind middle, fully striate.

- 2 (5). Elytral border rounding shoulder and continuing inwards to a point opposite stria 5.
- 3 (4). Antennae moniliform, base of prothorax with a few punctures, elytra flat and parallel-sided, with four dorsal pores. Length 3-4 mm. (western coasts of Europe, Morocco).

Underside, head, and prothorax dark metallic green or cupreous; palpi, three basal segments of antennae, legs, hind angles and sometimes lateral margins of prothorax, and the elytra pale ferruginous, the elytra dull and usually with a vague greenish cloud on the disk just behind middle. *Head* with wide, rather shallow frontal furrows, extending to clypeus. *Prothorax* convex, cordate, a fourth wider than long, base unbordered at middle, sides well rounded in front and strongly sinuate before base, hind angles sharply rectangular; median line fine, front transverse impression slight, vaguely punctate, basal sulcus and the small foveae fairly deep. *Elytra* about a fourth wider than prothorax, nearly two-thirds longer than wide, a slight emargination on each side behind, where stria 8 joins the marginal channel; striae moderately deep and finely punctate, 1 and 2 deep to apex, where they join, 8 deep behind; intervals moderately convex, the inner wider than the outer ones. Metasternal process with only the vestige of a border, a transverse depression behind it.

TYPE not now traceable *laterale* (Sam.).*

(The variety *bedeli* Nicolas (1906, *L'Échange* 22 : 13) is only a form which has lost all the green colour and is consequently very pale.)

- 4 (3). Antennae filiform, base of prothorax impunctate, elytra moderately convex, with the sides a little rounded, two dorsal pores. Length 5.5-6.5 mm. (CHINA : Foochow (*M. S. Yang*), numerous examples). Pale ferruginous, moderately shiny, elytra a little dull; palpi, segments 1 to 4 of antennae, and legs flavous; rest of antennae, apex of mandibles, vertex, front and hind margins of prothorax, base and an area near apex of elytra more or less fuscous. *Head* with wide, fairly deep frontal furrows, extending to clypeus, their surface behind vaguely rugose striate. *Prothorax* convex, cordate, a fourth wider than long, apex a third wider than base, which is truncate and bordered at middle, sides rounded in front, sinuate at a fourth from base, hind angles right and moderately sharp; median line fairly deep, front margin vaguely punctate and longitudinally striate, basal sulcus very deep. *Elytra* rather more than a third wider than prothorax and longer than wide in the same proportion, moderately emarginate on each side near apex; striae appearing dark on the pale background, fairly deep, and evidently, though finely, crenulate, 5 joining 1 at apex, and 6-7 disappearing at some distance from apex; intervals a little convex on disk, more convex at sides, the two dorsal pores adjoining stria 3, placed at a half and five-sixths, another pore close to apex. Prosternum sulcate, metasternal process unbordered, with an elongate convexity.

TYPE in the British Museum *sinicum* sp. n.

- 5 (2). Elytral border angulate at shoulder.
- 6 (9). Metatrochanters, at least in the ♂, three-fifths as long as femora, each produced at extremity into a long slender point (*Armatocillenius*).
- 7 (8). Base of prothorax wider than apex, elytra moderately convex, shoulders rounded, striae shallow, four dorsal pores, colour pale ferruginous. Length 4.5 mm. (FORMOSA : Anping).

Basal segments of antennae and legs flavous; surface moderately shiny. *Head* with very shallow frontal furrows, not extending to clypeus,

antennae filiform but a little dilated at apex. *Prothorax* moderately convex, very little contracted behind, a fifth wider than long, base arcuate, nearly a fourth wider than apex, very gently rounded in front and then straight to base, hind angles fairly sharp but slightly obtuse; median line slight, basal sulcus very deep, terminating at each end in the punctiform basal foveae. *Elytra* elongate-oval, moderately convex, parallel-sided, a third wider than prothorax, five-sixths longer than wide, border extending inwards to a point opposite stria 4, a deep emargination on each side behind, the outer angle of which is dentate; striae very lightly impressed, a little deeper near apex, vaguely crenulate; intervals nearly flat, the hindmost dorsal pore close to apex. Prosternal process sulcate; metasternal process also sulcate, vaguely bordered at sides; metatrochanters in the ♀ (*teste auctor*) shorter than in the ♂, pointed but not prolonged.

TYPE (♂) in the Deutsches Entomologisches Museum, Berlin-Dahlem.

This is the only example seen *formosanum* (Dupuis).*

- 8 (7). Base of prothorax narrower than apex, elytra rather flat, striae moderately deep, two dorsal pores, colour black, each elytron with a small post-humeral ferruginous spot. Length 4 mm. (NEW GUINEA : Sorong).

Piceous beneath; palpi (except penultimate segment of the maxillaries fuscous), antennal segments 1, 2, and basal half of 3 (rest fuscous), tibiae, and tarsi ferruginous. *Head* with fairly deep, wide, parallel, uneven furrows, extending to clypeus, and separated on each side from the eye by a rounded ridge, antennae slender, filiform, slightly dilated towards apex. *Prothorax* convex, cordate, a third wider than long, base arcuate, with a slight emargination on each side close to the angle, vaguely bordered at middle, sides with a slightly crenulate border, moderately rounded in front, sinuate near base, hind angles right and sharp; median line fine, basal sulcus very deep, crenulate, merging in the foveae at sides. *Elytra* rather flat, only slightly dilated behind, a sixth wider than prothorax, nearly twice as long as wide, border extending inwards to stria 4, a slight emargination on each side behind; striae moderately deep, vaguely crenulate, a little deeper at sides and much deeper at apex, especially 2, 5, and 8; intervals slightly convex on disk, more convex at sides and apex, the inner wider than the outer ones, 6 raised near apex. Prosternal process sulcate, metasternal process uneven but not bordered.

TYPE in the Genoa Civic Museum. This, the only example seen, is apparently a ♂, but the condition of the specimen renders this a little uncertain *albertisi* (Putz.).†

- 9 (6). Metatrochanters normal, less than half as long as femora, and more or less rounded at apex.
- 10(11). Elytra very flat, the basal border extending from shoulder to stria 4 (though rather vague between 4 and 5), colour of upper surface aeneous, elytra with an olivaceous tinge. Length 4.5-5 mm. (JAPAN : Yokohama, Kawasaki and Hiratsuka; Osaka, Hamadera).
- Palpi (except the apical, and sometimes also the penultimate segment), the three basal segments of the antennae, legs (apex of tibiae and the tarsi fuscous), and lateral and apical borders of elytra pale ferruginous, the elytra sometimes (type) with a brownish patch nearly covering the basal third. *Head* with wide and fairly deep frontal furrows,

* 1912, *Ann. Soc. ent. Belg.* 56 : 334.

† 1875, *Ann. Mus. civ. Stor. nat. Genova*, 7 : 748.

extending to clypeus, antennae filiform. *Prothorax* rather flat, subcordate, a third wider than long, base arcuate, a little narrower than apex, with a shallow border at middle, sides gently rounded in front, faintly sinuate before base, hind angles sharp, though a little obtuse; median line slight, basal sulcus and foveae deep, the sulcus uneven. *Elytra* slightly dilated behind, about a fourth wider than prothorax, four-fifths longer than wide, a slight emargination on each side behind; striae moderately impressed, impunctate; intervals nearly flat, the inner wider than the outer ones, 6 strongly raised at apex, two dorsal pores adjoining stria 3, another close to apex. Metasternal process unbordered, with an elongate convexity, depressed at sides and behind.

TYPE in the British Museum *yokohamae* (Bates).*

- 11(10). *Elytra* somewhat convex, the basal border extending from shoulder to stria 5, colour of upper surface mainly ferruginous.

- 12(13). Form long and narrow, upper surface shiny; prothorax a fifth wider than long, only moderately contracted behind and with only a vestige of a basal border; elytra parallel-sided, three-quarters longer than wide. Length 4.5–5 mm. (but my two examples are under 4 mm. long) (NEW SOUTH WALES: Sydney, Port Jackson and La Pêrouse).

Ferruginous, head and prothorax dark green, shiny; elytra each with the base, sutural interval (on basal half), a discal spot of variable size, situated between the dorsal pores, and a small transverse spot near apex piceous, with faint greenish reflections; segments 5 to 11 of the antennae brown (one of my two examples is ferruginous throughout). *Head* with deep, parallel, frontal furrows, extending to clypeus, antennae submoniliform. *Prothorax* convex, cordate, base arcuate, evidently narrower than apex, sides rather gently rounded in front, sinuate a little before base, hind angles right and sharp; median line moderately impressed, basal sulcus and foveae deep. *Elytra* elongate-oval, moderately convex, a fourth wider than prothorax, subtruncate behind; striae moderately impressed, almost imperceptibly crenulate, none quite reaching base; intervals only slightly convex, the inner not much wider than the outer ones, two dorsal pores and a third close to apex. Metasternal process hardly raised, slightly depressed at sides.

TYPE in the Museum of the Council of Scientific and Industrial Research, Canberra *mastersi* Sloane.†

- 13(12). Form moderately wide, upper surface shagreened; prothorax a third wider than long, strongly contracted behind, median part of base evidently bordered; elytra with gently rounded sides, a half longer than wide. Length 4.2–4.7 mm. (but my example is 5 mm. long) (QUEENSLAND: Townsville).

Ferruginous, basal half of venter piceous; head (excluding neck), middle of base of prothorax, and a vague cloud overspreading the elytra (except lateral margins), most visible near base and on apical half, green; inner margin and apex of mandibles piceous; 3 basal segments of antennae (rest fuscous), palpi, and legs flavous. *Head* with deep, wide, frontal furrows, extending to clypeus, antennae filiform, dilated towards apex. *Prothorax* convex, cordate, base slightly arcuate, sides strongly rounded in front and as strongly sinuate behind, hind angles right and sharp; median line slight,

* 1883, *Trans. ent. Soc. Lond.* 1883 : 268.

† 1894, *Proc. linn. Soc. N.S. Wales* (2) 9 : 404.

basal sulcus and foveae deep, finely crenulate. *Elytra* somewhat convex, elongate-oval, a fourth wider than prothorax, subtruncate behind; striae moderately impressed, impunctate, none quite reaching base; intervals nearly flat, the inner not much wider than the outer ones, 6 raised behind, two dorsal pores and a third close to apex. Prosternal process sulcate; metasternal process unbordered and with an elongate convexity.

TYPE in the Museum of the Council of Scientific and Industrial Research, Canberra. Only one example seen *albovirens* (Sloane).*

- 14 (1). Hind lateral seta of prothorax placed conspicuously on the border at about a sixth in front of the angle; metepisterna a little longer than wide. *Elytra* very convex, with rounded sides, widest at about basal fourth, striae shallow or obsolete at sides and near apex, surface shiny (all NEW ZEALAND).
- 15(20). *Elytra* with three, sometimes four, dorsal pores.
- 16(19). Prothorax strongly contracted behind, so that the apex is about a third wider than the base; elytral striae moderately impressed on disk, border subangulate at shoulder and bending back for a very short distance to a point opposite stria 5. Colour yellowish-white with black or dark aeneous markings. Length 4-5 mm.
- 17(18). Elytral border moderately dilated and reflexed at the point where the marginal channel terminates behind, with a slight inner emargination on each side, surface surrounding the shoulders strongly shagreened. Length 4-5 mm. (Tairwa, near Auckland).

Head, base, apex, and disk of prothorax, suture of elytra and a triangular spot on each, based on stria 2, and extending to stria 7, the two spots joining at a third from apex, black or dark aeneous; sides of prothorax and basal ventral segments brown; antennae darker towards apex. Head with moderately deep, uneven, parallel, frontal furrows, extending to clypeus, front supraorbital pore adjoining eye very large, antennae submoniliform. Prothorax very convex, a fifth wider than long, widest a little before middle, base arcuate, apex slightly emarginate, nearly a third wider than base, sides very narrowly bordered, strongly rounded from apex up to a point close to base, where there is a slight sinuation, hind angles inconspicuous, a little obtuse; median line slight, basal sulcus deep, somewhat crenulate, placed much nearer to base than in the non-endemic species, not quite reaching the small foveae, which adjoin the hind angles. *Elytra* convex, obovate, a third wider than prothorax, three-fifths longer than wide, shoulders completely rounded; striae vaguely crenulate, moderately deep on disk, shallower at sides and behind, obsolete on shoulders, 1 deep to apex, striae vestigial, marginal channel widening out a good deal on apical half; intervals convex on disk only, the inner, especially 2, wider than the outer ones, the three dorsal pores on the interval, though near stria 3, at about a fifth, three-fifths, and four-fifths, another close to apex. Microsculpture of the elytra formed by very small meshes; on the head the meshes are very faint, and there is none on the disk of the prothorax. Metasternal process unbordered. Protarsi ♂ with segments 1 and 2 strongly dilated and outwardly produced at apex.

TYPE in the British Museum *albescens* (Bates).†

- 18(17). Elytral border strongly dilated and reflexed behind, with a fairly deep inner emargination on each side, the outer angle of which projects

* 1903, *Proc. Linn. Soc. N.S. Wales*, 28 : 575.

† 1878, *Ent. mon. Mag.* 14 : 193.

backwards as a rounded tooth, surface surrounding the shoulders shiny. Length 5 mm. (Karekare, west of Auckland).

Underside more or less ferruginous; head, prothorax, and disk of the elytra black; palpi, segments 1 to 4 of antennae (rest brownish), legs, epipleura, and sides of elytra flavous, the pale colour on the elytra only covering the marginal channel at middle, but widening out at both extremities, and close to base and apex reaching stria 2.

Very nearly allied to *albescens*, but a little narrower. *Head* and *prothorax* as in that species, but the antennae are more evidently moniliform. *Elytra* narrower, four-fifths longer than wide, the sides less rounded, the marginal channel and apical truncature differing considerably, as set forth above.

TYPE in the British Museum *ulacre* (Broun).*

- 19(16). Prothorax moderately contracted behind, the apex barely a fifth wider than base; elytral striae shallow, even on disk, the border terminating at shoulder, without bending backwards and inwards. Colour ferruginous, with some slight brownish markings. Length 3.5-4 mm. (Port Chalmers).

The brown markings include the head, disk of prothorax, suture of elytra, and venter. Smaller than *albescens* and quite different in colour. *Head* with the antennae shorter and evidently moniliform. *Prothorax* less contracted behind, the basal sulcus shallower. *Elytra* hardly more than a half longer than wide, the marginal channel not quite so wide behind, the emargination on each side slighter; striae shallow, faint at sides, finely but distinctly punctate, more evidently than in *albescens*, owing to the flatter intervals.

TYPE in the British Museum, as is the type of *batesi* Sharp (see below) *chalmersi* (Broun).†

- 20(15). Elytra with two dorsal pores (Tahuna, Nelson) "Nitid, elongate, convex, body testaceous, thorax darker; head, tips of mandibles, and a narrow portion of front of thorax and basal margin piceous. Head, hardly as broad as thorax, smooth, with interocular depressions; eyes large and prominent. *Thorax* as broad as long, sides rounded, marginate, widest just before the middle, narrowest behind, a little incurved apically, base subtruncate, with a transverse depression, disc with a distinct median line, and a faintly raised semicircular ridge just behind the apex; lateral margins with 2 setigerous punctures on each side, one a little in front of the middle, the other near the posterior angles. *Elytra* two and one-third times as long as prothorax, elongate-ovate, widest at middle thighs, broadly rounded and slightly narrowed to apices, interstices flatly convex, striae shallow, with feeble punctures, the third interstice with two fuscous setigerous punctures on each side. *Legs*, anterior tibiae moderately stout, median and posterior slender, all bearing pallid hairs, and also the tarsi, tibial spurs long and slender.

Holotype, male, length 4 mm., breadth 1.4 mm.

Allotype, female, length 3.9 mm., breadth 1.3 mm.

In collection Cawthron Institute, Nelson.

Paratypes in author's collection." *tillyardi* (Brookes).‡

Note.—Since the above memoir was written a specimen has come to light in the British Museum collection which proves to belong to a new species.

* 1921, *Bull. N.Z. Inst.* 1 (7) : 601.

† 1886, *Man. N.Z. Col.* 3 : 881 (= *batesi* Sharp, 1886, *Sci. Trans. R. Dublin Soc.*

3 (2) : 374 = *batesianum* Csiki, 1928, *Carabidae Col. Cat.* 97 : 130).

‡ 1927, *Trans. N.Z. Inst.* 57 : 563.

Bembidion (Cillenius) insularum sp. n.

Length 4.5 mm.

Aeneous, brighter above than beneath; palpi, segments 1 to 3 of antennae, legs, marginal channel and epipleura of elytra more or less ferruginous; metasternum brownish.

Head with deep, wide, frontal furrows, extending to clypeus, surface impunctate, antennae filiform. *Prothorax* convex, cordate, fully a third wider than long, apex a third wider than base, which is arcuate and, except for a short distance, bordered at middle, widest close to apex, sides with a rather thick border, crenulate on basal half, gently rounded, strongly contracted behind, slightly sinuate before the angles, which, though sharp, are a little obtuse; median line deep on the disk only, front transverse impression vague, some slight transverse rugae behind it at middle, basal sulcus very deep, finely crenulate, surface impunctate. *Elytra* only moderately convex, parallel-sided, about a third wider than prothorax, two-thirds longer than wide, border rounding shoulder and curving slightly back, to end in a small tubercle, at which point the marginal channel joins stria 5, a moderate sinuation on each side behind; striae deep, finely crenulate, 1, 2, and the striae arising together in a large umbilicate pore, 6 and 7 terminating at some distance from apex; intervals convex, more convex at sides, the inner a good deal wider than the outer ones, two dorsal pores adjoining stria 3, at a half and four-fifths, another pore close to apex, surface impunctate. Metasternal process unbordered, metepisterna longer than wide, metatrochanters not produced to a fine point at apex.

FIG1: Suva (C. T. McNamara), 2.v.1925, 1 ex.

In the foregoing key the species comes near *laterale* and *sinicum*, but in appearance it is more like *yokohamae*. Smaller and more convex than the last-named species, upper surface bright instead of dull, elytral striae deeper, especially stria 1, intervals much more convex, border not angulate at shoulder, and not extending inwards beyond stria 5.

TWO NEW SPECIES OF ORIENTAL ODONATA

By LT.-COL. F. C. FRASER, I.M.S. Retd., F.R.E.S.

AMONG a large amount of material collected in Siam and Laos by Dr. A. Kerr, I find that I have overlooked two new species of Odonata. One of these had been provisionally labelled as *Allophaea ochracea* (Selys), which it greatly resembled, but on a closer examination, it was found to be a new species belonging to the nearly related genus *Dysphaea*. The other new species closely resembles *Rhinagrion mima* (Karsch), but the colours and markings of the abdomen, in particular, differ so widely that I have no hesitation in pronouncing the species as new.

***Dysphaea gloriosa* sp. n.**

♂: Hind-wing 32–35 mm. Abdomen 38–40 mm.

Head black marked with bright ochreous as follows: the lateral lobes of labium, the whole of labrum save for a narrow bordering of black and a short tongue of the same colour nearly traversing its middle, a broad transverse band on frons which descends the genae laterally, and lastly a small spot on each side of the vertex close to the outer ocellus. Prothorax black, its middle lobe with a large, raised, oval, ochreous spot on each side which is nearly confluent above over dorsum with its fellow, its posterior lobe with a large irregular spot on each side. Thorax velvety black with the following bright citron yellow markings: a small oblique spot on each side bordering the alar sinus, a narrow and complete antehumeral stripe broadening slightly below and curving strongly outwards above, an equally narrow humeral stripe angulated strongly forwards at the junction of its middle and lower thirds, a fine posthumeral stripe incomplete below, a pair of oblique stripes on each of mesepimeron and metepimeron narrowly confluent above. Legs black, the middle and hind pair of femora with a small distal spot of yellow on the outer side; the hind femora with a yellow stripe also on the outer side not quite meeting the distal spot. Wings a rich golden amber tint, this tint becoming increasingly intensified towards the base of wings from a level slightly distal to nodus. Apices slightly enfumed up to level of pterostigma which latter is long, narrow and black, covering 8–9 cells; about 30 antenodals and 20 postnodals in fore-wings, and 18–25 antenodals and 18–20 postnodals in hind-wings; discoidal cells traversed twice, but occasionally only once; 3 cubital nervures in all wings. Abdomen black with lateral stripes on segments 2–7 which broaden basalward and taper to a point apically, the stripes gradually decreasing in length from segments 3–7 and quite vestigial on segments 6 and 7, a narrow mid-dorsal line on segment 2 slightly dilated at each end, pale basal annules on segments 3–6. Anal appendages black, nearly twice the length of segment 10, rather compressed and broadened at the middle third, tapering to an obtuse point, coarsely spined on the outer side and with apices curling strongly inwards to meet or overlap each other. Inferior appendages very short, apposed and inconspicuous.

♀: Hind-wing 30 mm. Abdomen 32 mm.

Differs from the male by its more robust build, shorter abdomen, uncoloured wings and more extensive yellow markings. There is a median spot on epistome, the transverse stripe on frons is broader and extends backwards along the margins of eyes as well as forwards bordering the genae, the spots on vertex are much larger and oval in shape. The lateral stripes on the abdomen form a continuous unbroken line and there is a very large rounded spot on each side of segment 8. On the dorsum of segment 2 the mid-dorsal stripe extends outwards at each end to become confluent with the lateral yellow and so encloses two trapezoidal black spots. The middle as well as the hind femora broadly yellow on the outer sides. Wings hyaline or very palely enfumed, the apices only slightly so; pterostigma dark

ochreous between thick black nervures; venation as in the male but only one nervure traversing the discoidal cell; 26 antenodals and 14–15 postnodals in fore-wing: 23 antenodals and 16 postnodals in hind-wing.

Habitat: SIAM and LAOS. Pak Tawan, Prachaup Prov., Siam, 2 ♂♂, 31.viii.31; Bori Khane, Laos, Siam, 1 ♂, 29.iv.32; Muang Ban, Laos, Siam, 1 ♀, 28.iv.32. Type ♂ and allotype ♀ in my own collection.

This new species is very closely related to *D. ethela* Fraser, from which, however, it differs markedly by its deep golden-tinted wings. Otherwise, its size, long narrow wings and body markings are almost identical. The females of the genera *Dysphaea*, *Euphaea*, *Allophaea* and *Indophaea* are so much alike that it is only with difficulty that they can be differentiated, so that one can afford to be dogmatic in stating that the ancestral type was closely similar to these females. Accepting this as an hypothesis, those species in which the males most closely resemble the females must be the more primitive.

Of all the genera mentioned above, *Dysphaea* shows the closest resemblance between the sexes, those of *D. ethela* being remarkably alike, and that species therefore probably the most archaic of the group. Evolution in the males is marked first of all by a tinting of the wings which deepens to a strong amber shade, then becomes more or less enfumed and finally opaque. The opaque areas in *Euphaea*, the most highly developed of the genera mentioned, gradually extend to engulf the whole wing area. These changes are paralleled in *Dysphaea*, *Euphaea* and *Allophaea*, but the intermediate forms have become extinct in the case of *Indophaea*, whilst in *Allophaea* the changes in the wing colouring have stopped short before the opaque stage. Along with a development of colour in the wings, is found also a broadening of the hind-wing in *Euphaea* and *Anisophaea* and, to a less extent, in *Allophaea*.

Rhinagrion viridata sp. n.

♂: Hind-wing 23 mm. Abdomen 30 mm.

Head, prothorax and thorax marked exactly like *R. mima* (Karsch) but those on the prothorax and thorax a beautiful grass-green instead of bright yellow. Legs similar to those of *R. mima*. Wings hyaline, only 11 postnodals in fore-wing and 10 in the hind (13–14 in the fore-wings and 12 in the hind of *R. mima*), petiolation ceasing at the level of Ac or a fraction distal to that nervure, pterostigma black, covering 2 cells. Abdomen: segment 1 bright grass-green, its base blackish-brown and its apical border on each side finely black, segment 2 broadly black on dorsum for its basal half, grass-green for its apical half, the black changing to brown and then warm ochreous laterally, segment 3 similar but the grass-green area separated from the apical border by a broad black annule, the sides of which are prolonged basalwards and its dorsal part medially so as to enclose the green as a large cordate spot, segment 4 similar but the cordate green spot much smaller and entirely bisected dorsally by the black, segment 5 similar to 4 but the dorsal spot ochreous and almost obscured by blackish, segment 6 similar to 5 but the spot enlarging again and bright ochreous, segments 7–10 bright ochreous separated by fine apical black annules, segments 9 and 10 black on the ventral borders, whilst 10 has a small rounded mid-dorsal black spot. Anal appendages not differing in shape or colouring from those of *R. mima*.

Habitat: SIAM–BURMA frontier, Tenasserim–Bachrup boundary, one ♂ (*Dr. A. Kerr*) 28.v.32. This beautiful species is very closely related to *R. mima*, differing from it by its smaller size, by the different colour of the prothorax and thorax and the different colour and character of the markings of abdomen. The wings have a lower nodal index and the petiolation stops short slightly distal to the level of Ac. Type in my own collection.

ON THE BRITISH LESTREMIINAE, WITH NOTES ON
EXOTIC SPECIES.—5. (DIPTERA, CECIDOMYIIDAE)

By F. W. EDWARDS, M.A., Sc.D., F.R.E.S.

Cordylomyia Felt, 1911.

(*Prosaprinus* Kieffer, 1913).

In this genus I include several species which have wings and tarsi resembling those of *Campylomyza* sensu stricto, but (1) the characteristic cup-like sensoria of *Campylomyza* are lacking, being replaced in the female antenna of *Cordylomyia* by numerous sensory hairs or spines; and (2) the male hypopygium (though taking various forms) is never quite of the *Campylomyza* type, the ninth tergite being much better developed. Several of the species have the eyes divided as in *Campylomyza*, but in others the division is incomplete, the upper and lower portions of each eye being separated by a narrow "neck" consisting of an irregular single or double row of facets. Other characters vary much according to the species, of which several distinct groups may be recognised.

Felt's excellent photograph of the hypopygium of his *C. coprophila* (the genotype of *Cordylomyia*) shows that this species is closely related to *C. xylophila* sp. n. and *C. rudis* (Winn.). Kieffer's *Pr. cellularis* (genotype of *Prosaprinus*) seems also to be nearly related to *C. rudis* as the description notes the subcylindrical antennal segments (2 + 10), the length of *R*₁ (five times *R*_s) and the broad costal cell; indeed the only remark in the description which suggests that *P. cellularis* may not be identical with *C. rudis* is the statement that the empodium reaches three-fourths of the length of the claws, instead of being of the same length.

C. rudis (Winn.) (fig. 11, a, i, o).

(*C. fuscineris* (Winn.) ♂ nec ♀).

One of the largest species of the tribe; body blackish, legs and other appendages also dark brown to blackish (in mature specimens). Thoracic integument dull, dusted with dark grey, hair pale. Mesonotal hair chiefly present on sides and in two dorso-central stripes, very few small hairs between the main stripes in front. Eyes not divided, one or two facets wide at narrowest. First segment of palpi with dense patch of short sensory bristles. Claws very finely denticulate, the most obvious of the few denticles subapical, sometimes only this one visible. Wings broad at base; *Cu*₂ straight, nearly but not quite reaching margin forming with *Cu*₁ a very acute angle.

♂. Antenna long, necks mostly about equal in length to basal portions of segments, neck of penultimate segment not much shorter; only one complete crenulate whorl. Abdomen with all tergites well developed and broad, including eighth (ninth smaller). Hypopygium: Sternocoxite with fairly deep median emargination; style subcylindrical, fully twice as long as broad, rounded at tip; anal segment not obvious; genital rod with large membranous expansion at tip. Wings with costal cell only moderately broad and anal area not very large; length 2–3 mm.

♀. Antennal flagellum of 10 segments, each with a total length nearly twice its breadth (1·8), necks about as long as broad (but not usually obvious in the dry specimen), sensory hairs numerous (especially on one side) but all slender and of moderate length. Abdomen scarcely extensile, tergites 2–6 all well developed; two equal subglobular spermathecae about as large as the cerci and both strongly sclerotised. Wings with costal and anal cells larger than in ♂, but otherwise similar; length 2·6–4 mm.

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OXON. : series taken in University Museum (*Hamm*). CAMBS. : Cambridge (*Jenkinson*). HANTS. : New Forest (*Adams*). HERTS. : Letchworth (*F. W. E.*). MORAYSHIRE : Logie, 1 ♂ (*Jenkinson*). All specimens except the one from Logie taken in winter (October to March).

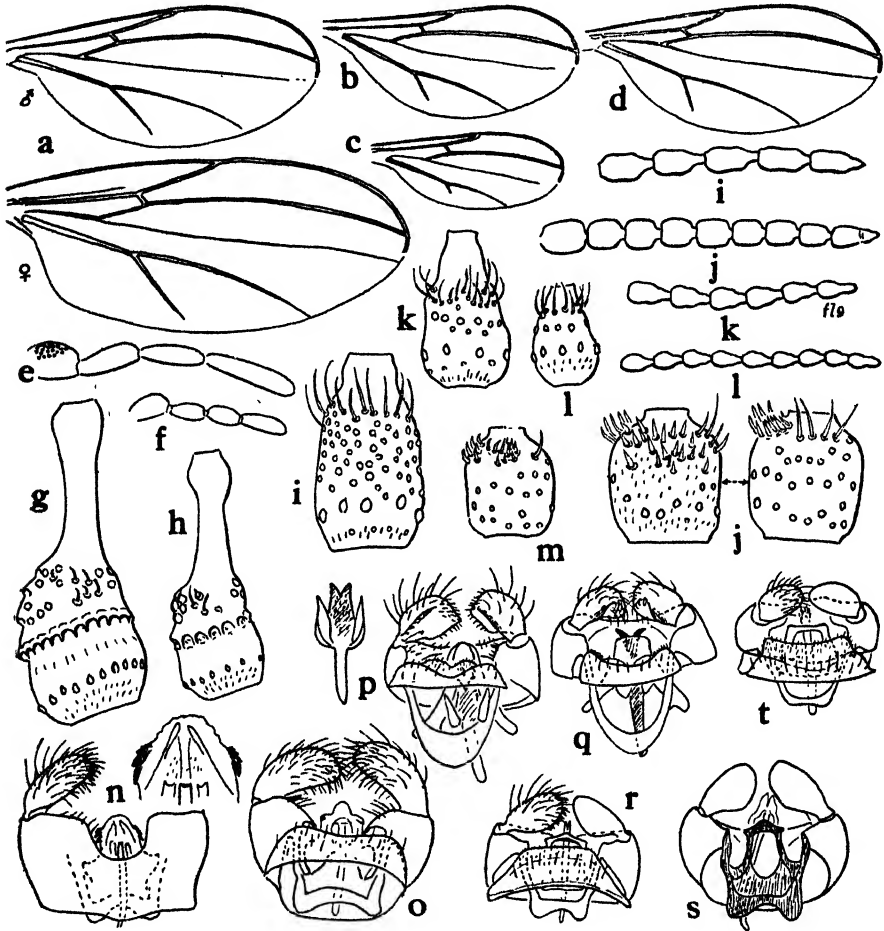


FIG. 11.—British *Cordylomyia*. a-d. Wing-venation. e, f. Palpi. g, h. Single flagellar segments of ♂. i-m. Tips of antennae of ♀, with single segments enlarged. n-t. Hypopygia of ♂. a, i, o, *rudis* (Winn.). e, j, n, *xylophila*. b, r, s, *hammi*. d, f, h, k, p, q, *bifida*. c, *bifida* var.? t, *hammi* var.?

C. xylophila sp. n. (fig. 11, e, j, n).

Very similar and obviously closely allied to *C. rudis* (Winn.), but rather smaller.

♂. The only discoverable difference from the ♂ of *C. rudis* is in the structure and shape of the aedeagus (compare fig. 11, n, o); the distinctions are very small and of doubtful value, but appear constant in the few specimens examined. Wing-length 2 mm.

♀. Differs obviously from the ♀ of *C. rudis* in the shorter antennae; flagellar segments not much longer than broad (under 1.3), with necks very short or absent; sensory hairs nearly all very short and spine-like, some of them grouped into a nearly circular patch on one side; terminal segment in two of the three specimens examined small and fused with the penultimate (so that the antennae have actually 2 + 9 segments), but in the third specimen the last two segments are subequal as in *C. rudis*. Wing-length 2-2.7 mm.

HERTS.: Sherrard's Wood, Welwyn, 30.ix.37, 3 ♂♂ 1 ♀ over burnt larch stump; Hitch Wood, x.36, 1 ♀; Knebworth, 6.v.23, 1 ♀.

C. bifida sp. n. (fig. 11, c, d, f, h, k, p, q).

A much smaller species than *C. rudis* (Winn.), differing in venation in having *R*₁ relatively shorter (only about 3-4 times as long as *Rs*) and the cubital fork rather less acute, with *Cu*₂ rather more abbreviated. Palpi with comparatively few sensory hairs on first segment, not forming a conspicuous patch. Eyes divided, structure practically as in *Campylomyza flavipes* Mg. Empodium fairly broad and about as long as claws. Pore 5 on *R*₅ as in other species of this genus.

♂. Antennae much as in *C. rudis*, flagellar segments (including penultimate) with long necks and one complete crenulate whorl. Abdominal tergites 6-8 rather narrow. Hypopygium small; tergite rather narrow; sternocoxite with its posterior edge almost straight, scarcely emarginate in middle; style short, truncate, with a flange on dorsal surface; genital rod long, with large head and a blackened forked tip. Wing-length about 1.7 mm.

♀ (?). Antennae 2 + 9, flagellar segments somewhat flask-shaped, terminal one constricted beyond middle, distal part narrower; sensory hairs all of moderate length and slender, much as in *C. rudis*, but fewer. Abdomen rather greatly extensible; spermathecae absent (i.e. unsclerotised) in the single (possibly abnormal) specimen examined. Wings resembling those of ♂ in shape and venation; a peculiarity of this specimen is the presence of an extra pore on *R*₅ below tip of *R*₁. Wing-length just under 2 mm.

HERTS.: Knebworth Wood, 13.iii.38, 1 ♂ drowned in sap on stump of newly-felled birch; Letchworth, ix.36, 1 ♂ on window. YORKS.: Mulgrave Woods, Whitby, 16.iv.38, 1 ♀ on tree-trunk (*H. Britten, jr.*). The female is associated with the males owing to the similarity in eyes and wings, but only doubtfully.

Another female specimen, taken at Loch Callater, Aberdeen, vii.37 (*R. L. Coe*) resembles the one from Mulgrave in structure of antenna but is smaller (wing-length only 1.3 mm.) and *Cu*₂ is reduced to a short stump (fig. 11, e); two equal and subspherical spermathecae are present, as in *C. rudis*. This specimen perhaps represents another species of the group.

C. hammi sp. n. (fig. 11, b, r, s, t).

Very much resembles *C. bifida* sp. n., notably in the divided eyes and abbreviated vein *Cu*₂, but the empodium (though as long as the claws) is narrower, the cubital fork is rather more acute, and the hypopygium differs.

♂. Necks of flagellar segments even longer than basal portions (penultimate a little shorter); one complete crenulate whorl. Abdominal tergites 6-8 rather narrow. Hypopygium small; tergite rather large (including a less sclerotised distal portion); sternocoxite as in *C. bifida*; style short, broadest in middle, without flange; tegmen forming a heavily sclerotised arch; genital rod long, tip not blackened and not obviously bifid. Wing-length about 1.7 mm.

♀. Not obtained (unless the ♀ described under *C. bifida* belongs here).

HERTS.: Letchworth, ix.37, 2 ♂♂ on window. BUCKS.: Ivinghoe Common, 3.x.37, 1 ♂. OXON.: University Museum, 24.x.19, 2 ♂♂ incl. type (*Hamm*).

One of the two males from Letchworth differs slightly in hypopygium from the other four specimens, the style not being so broad (fig. 11, t).

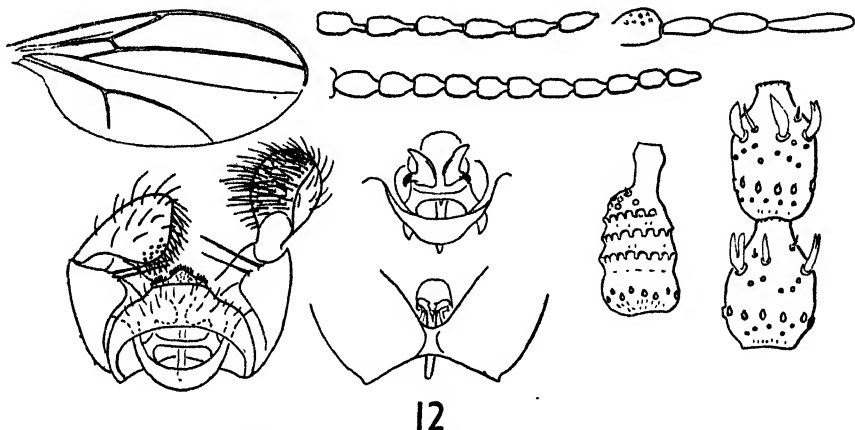


FIG. 12.—*Cordylomyia pinetorum* sp. n. Wing of ♀; tip of antenna of ♂ and whole flagellum of ♀ in outline; palpus; hypopygium; enlarged flagellar segments of ♂ and ♀.

C. pinetorum sp. n. (fig. 12).

This species differs considerably from all those described above in antennae and genitalia, and in other respects as described below. Eyes divided as in *Campylomyza*. Palpi without obvious sensory patch on first segment. Mesonotum with rather numerous small pale hairs spread over most of the surface. Empodium rather broad. Wings with cubital fork wide, *Cu2* slightly curved and slightly abbreviated.

♂. Antennae with necks barely half as long as basal part of segments; two complete crenulate whorls, and a third passing more than half-way round. Abdominal tergites 5–8 very narrow. Hypopygium: tergite broadest in middle; anal segment better developed than in the other species, with numerous short stiff bristly hairs; coxites divided almost to the base beneath; style very broad, hairy on inner surface; genital rod much as in *Campylomyza*. Wing-length about 1.7 mm.

♀. Antennae 2 + 11; flagellar segments approximately oval, provided subapically with a whorl of about six stout sensory blades, some of them bifid at the tip, and a few shorter and more slender hairs. Abdomen with tergites 2–6 rather large and undivided, 7–9 forming a more or less extensible ovipositor. A single rather large disc-like spermatheca present, as in *Campylomyza*. Fourth tarsal segment of front legs about twice as long as broad, fifth slightly longer and thicker than fourth. Wing-length about 2.3 mm.

DEVON: Sidbury, v.36, very abundant in pine-wood, 15 ♂♂ 23 ♀♀ preserved. HERTS.: Hitch Wood and Sherrard's Wood, x.36, among larches. BUCKS.: Ivinghoe Common, v.38, 1 ♂. N. LANCs.: Low Wood, v.38, under yew tree, 4 ♂♂ 1 ♀; Manchester, x.29, 1 ♀ (*H. Britten*). SCOTLAND: Cromarty, viii.09, 1 ♀ (*King*).

Corinthomyia Felt.

The main feature upon which Felt founded this genus was the structure of the male antenna, the flagellar segments being provided with numerous similar whorls of short hairs instead of the usual three or four dissimilar whorls of longer hairs. The genus has hitherto been recorded only from North America, and the female sex has not been recognised. I have, however, examined one male from Austria of a species which is very close to, if not identical with, *C. cincta* Felt, and several females from Britain which probably belong to the same species. From a study of these specimens it is clear that in most of its characters (other than the structure of the male antenna) *Corinthomyia* resembles *Cordylomyia* Felt; the female of the species examined differs from typical *Cordylomyia* principally in the wider cubital fork and the condition of the spermathecae.

It is not improbable that some of the American species described by Felt from the female only as *Cordylomyia* belong to *Corinthomyia*.

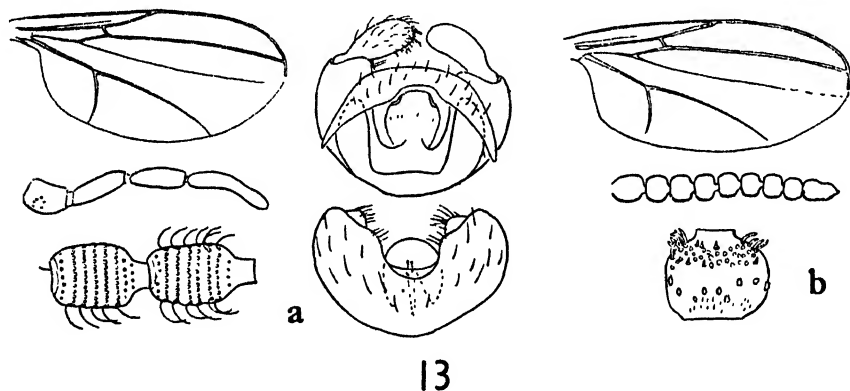


FIG. 13.—*Corinthomyia cincta* Felt ? a. ♂ from Vienna, wing, palpus, antennal segments (anterior view, diagrammatic), hypopygium. b. ♀ from Letchworth, wing, outline of flagellum with one segment enlarged.

C. cincta Felt (?) (fig. 13).

Dark species; thorax blackish, legs and halteres dark. Mesonotal integument not or very slightly shining, rather uniformly but not densely clothed with short pale hair. Eyes 2-3 facets wide at narrowest point. Palpi with sensory patch on first segment inconspicuous. Tarsi with hairs only. Claws very finely denticulate, empodium broad. Wings as figured.

♂. Flagellar segments with four complete crenulate whorls, and two or three more passing about half-way round the segment (these evidently included by Felt in the total of seven whorls noted as present in his species). Hypopygium as figured; structure in general very similar to that of *C. rudis* (Winn.). Wing-length 1.8 mm.

♀ (?). Antennae 2 + 9, flagellar segments except first and last somewhat broader than long, with a subapical band of very numerous short sensory spines and some a little longer; terminal segment longer, constricted slightly near middle. Abdomen with tergites 2-6 large and undivided. Spermathecae two in number, one very small and strongly sclerotised, the other large but weakly sclerotised. Last two segments of front tarsi subequal. Wing-length about 2 mm.

AUSTRIA : Vienna, 1 ♂ (*Mik*; determined as *C. atra* Mg.).

ENGLAND : Letchworth, Herts., 5 ♀♀, taken on windows viii.1919, viii.1935, ix.1936 and viii.1937.

The females from Letchworth are provisionally determined as *C. cinninna* on account of the rather close resemblance in the wings, the cubital fork being much wider than in most species of *Cordylomyia*. A very similar (badly damaged) female is in Meigen's collection in Paris labelled *C. atra*.

Xylopriona Kieff. and *Tetraxyphus* Kieff. (figs. 14, 15).

These two genera of Kieffer's were founded principally on the structure of the female antenna; in most other respects they are alike, and there appears to be no clear distinction between them in the male sex; moreover, intermediate types of female antenna occur, so that the two genera might well be united.* The following characters are common to both :—

Eyes two or three facets wide at narrowest point. Front with rather deep median furrow, on each side of which are a few short hairs. Palpi 4-segmented, rather long, first segment not much thicker than second; no distinct scales. Antennae of ♂ 2 + 12, flagellar segments very eccentric, shaped much as in *Cordylomyia* Felt (fig. 11, g), with one complete crenulate whorl. Antennae of ♀ 2 + 12 to 2 + 22, varying according to the species and to some extent individually; sensoria various but never forming a complete cup and never only two in number, usually four.

Mesonotum black, surface more shining than in other genera of the tribe; pubescence rather uniformly distributed but not very dense. Tarsi with hairs and sometimes with narrow scales mixed with the hairs. Empodium as long as claws and quite broad. Claws finely denticulate or striate on outer surface about middle, not enlarged near tip. Wings with dense macrotrichia, present also on *R*₅. Costa reaching nearly as far as tip of *M*. *R*₁ of moderate length, 2-3 times as long as *rm*, which is very oblique; *Cu* faint towards tip, not quite reaching margin. Pore 5 on *rm*.

Hypopygium: tergite narrow, but usually less so than in *Campylomyza*; cerci not usually distinguishable; sternocoxite with moderately large V-shaped indentation of posterior margin; style rather small, infolded, with a terminal spine; tegmen shield-shaped; genital rod as long as tegmen, its tip not enlarged. Spermathecae: two in number, small, round, thick-walled.

The two groups of species included here are distinguished as follows in the female sex :—

Xylopriona (fig. 14): Flagellar segments broader than long (excluding the neck), sensoria in the form of broad plates, normally four in number but in some cases two of them are fused into one plate occupying half the circumference of the segment; plates each arising from a row of pores which may be all small or one may be much larger than the rest. Abdomen with tergites 2-4 reduced or faint; segments 5-8 forming a long protrusible ovipositor. Last segment of front tarsus without specially dense pubescence beneath, but with a few longish hairs overhanging claws.

Tetraxyphus (fig. 15): Flagellar segments with the basal part (excluding neck) at least as long as broad, sensoria in the form of pointed blades, rarely bifid at tip, varying in length with the length of the neck, and always four in number; each blade usually arising from a single large pore though occasionally one or two smaller pores are also

* It is not unlikely that both *Xylopriona* and *Tetraxyphus* will have to be sunk under *Monardia* Kieff., but as I have not yet been able to examine the genotype of *Monardia* I leave them separate for the present.

present. Abdomen with tergites 2-5 all well developed, broadly rectangular; ovipositor not greatly protrusible. Last segment of front tarsus more or less enlarged, and provided with dense short hair beneath forming a sole.

In the male sex I have been unable to discover any clear distinction between the two groups, but sensoria more or less similar in type to those of the females (though smaller and in a more rudimentary condition) may usually be detected on the first three or four flagellar segments.

Kieffer included three species in *Xylopriona*, but two of these (*kollari* (Winn.) and *antennata* (Winn.)) were evidently known to him from descriptions only; they have rudimentary empodia and do not properly belong here.

X. pulchricornis Kieff.

Kieffer described the flagellar segments of the type ♀ (20 in number) as having three sensoria, one very broad and apparently occupying about half the circumference, the other two nearly semicircular and each united with a filiform appendage on the side adjacent to the larger sensorium. None of the specimens I have examined could be described as having "filiform appendages" to any of the sensoria and I therefore feel bound to regard the British forms so far obtained as distinct from *X. pulchricornis*, though they are evidently very similar. Kieffer, moreover, describes the ovipositor (including the cerci) as clear yellow, which is not the case in British specimens.

X. querceti sp. n. (fig. 14).

♀. Membranous parts of body yellow, hence abdomen in life appears largely yellow owing to reduction of tergites; legs and halteres blackish, but tarsi somewhat lighter; cerci dark, not clear yellow; ovipositor appearing largely blackish in life. Mesonotal hair blackish. Antennal flagellum with 16-17 segments, necks very short (fig. 14, b, j, k). Last segment of front tarsi scarcely half as long again as penultimate (fig. 14, h). Abdomen with first tergite forming a very narrow transverse strip; second broader but still transverse and quite small; third larger than second, squarish; fourth segment large but without well-defined tergite. Wing 2.2-2.5 mm.

♂. Differs from ♀ in having mesonotal hair yellow. Necks of flagellar segments (including that of the penultimate one) about as long as the basal portion (fig. 14, d, a segment near base of antenna to show sensoria). Hypopygium (fig. 14, g): tergite reduced to a very narrow strip bearing a single row of hairs, much as in *Campylomyza*; roots of coxites arising very close to insertion of style.

BEDS.: Whipsnade, 8.iv.38, 2 ♂♂ 2 ♀♀ (incl. type ♀); Milton Bryan, 12.iv.38, 1 ♂ 2 ♀♀. HERTS.: Breachwood Green, 3.v.36, 1 ♀. Mostly at edges of oak-woods. Also 1 ♀ in old British collection without data, determined by Walker as *C. atra* Mg.

Although no specimens were taken paired it is almost certain that the males described belong with the females.

X. querceti var. *vel* sp. n.?

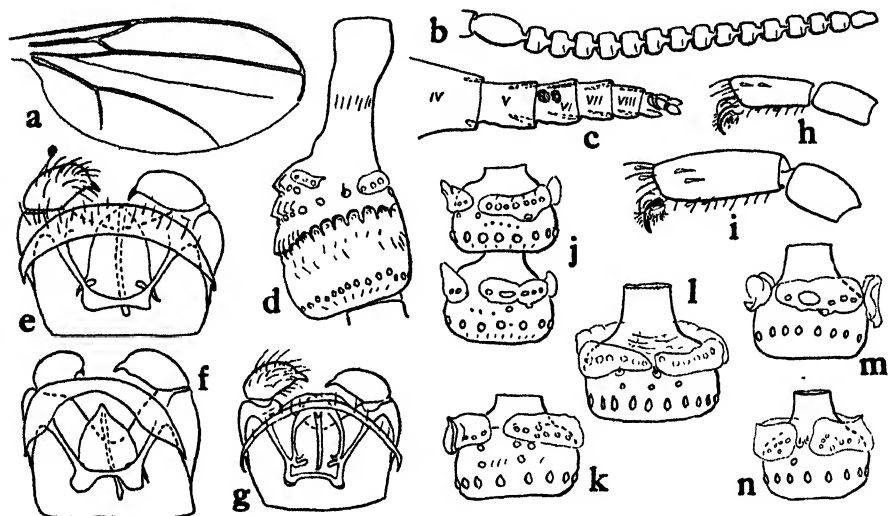
♀. Colouring and abdominal tergites much as in *X. querceti* sp. n. Antennal flagellum with 20 segments, necks much longer than in *X. querceti*, sensoria wide but not deep (fig. 14, l). Last segment of front tarsi about twice as long as fourth (fig. 14, i). Wing 2.8 mm.

♂ ? Hypopygium (fig. 14, e) with tergite much less reduced than in *X. querceti*, with roots of coxites arising further from base of style.

HANTS.: Farley Down, 20.v.36, 1 ♀ 1 ♂ taken over old beech stump at edge of wood.

As only these two specimens (both freshly emerged) were taken over this stump I have assumed they belong to the same species, but it is possible that the ♂ is that of a *Tetraxyphus* (its hypopygium is almost exactly like that of *T. ater* (Mg.)); if so the ♀ may be merely a variant of *X. querceti*.

Two females from near Crickhowell (Brecon) and one from Hitch Wood (Herts.) may represent either variations of *X. querceti* or possibly another species. They have 19–20 segments in the flagellum, necks not quite so long as in the Farley ♀, sensoria deeper (fig. 14, m, n), fifth front tarsal segment shorter, as in *X. querceti*. The Crickhowell specimens were taken on hazel stumps in a shady lane, four similar-looking males being taken at the same time; in three of these males the hypopygium (fig. 14, f) closely resembles, without being quite identical with, that of the Farley Down ♂ or *T. ater* (Mg.); the fourth exactly agrees with *X. querceti*.



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FIG. 14.—British *Xylopriona*. a. Wing-venation. b. Outline of flagellum of ♀. c. Ovipositor, only partially extended, showing spermathecae. d. Enlarged flagellar segment of ♂. e–g. Hypopygia. h, i. Last two segments of front tarsi of ♀. j–n. Flagellar segments of ♀. a–d, g, h, j, k, *querceti*. e, i, l, *querceti* var.? (Farley). f, n, *querceti* var.? (Crickhowell). m, *querceti* var.? (Hitch Wood). [N.B.—e and f are perhaps *Tetraxyphus* ♂♂ and not *Xylopriona*.]

T. ater (Mg.) (fig. 15).

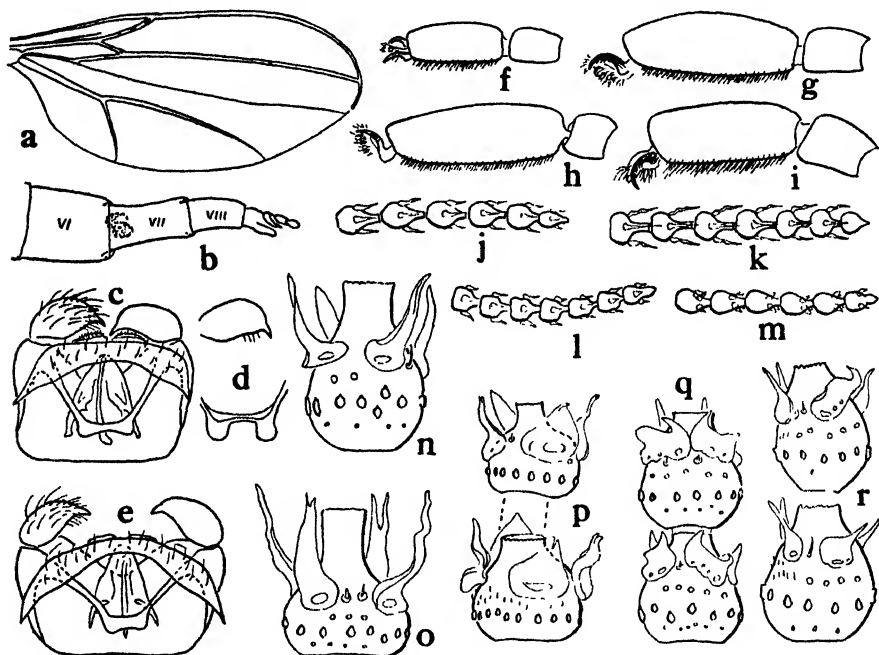
(*C. atra* Mg.; *C. halterata* Zett. ?; *C. valida* Winn.; *T. melanopterus* Kieff. ?).

I propose to fix Meigen's name to a form characterised as below. Meigen's type ♂ is fragmentary, but there is nothing to show that it was *not* this species, and the same may be said of Zetterstedt's *C. halterata*. Winnertz's types of *C. valida* agree, and as the species is evidently a common one I suspect that Kieffer's *T. melanopterus* is also the same; Kieffer describes the eyes as "non confluentes au vertex dans les deux sexes" and later as "distants au

vertex ($\delta\phi$)," but as I have seen no *Campylomyzine* in which the eyes are separated by more than a very narrow line on the vertex I imagine this may have been an error.

♀. Membranous parts of body dull reddish; but as the abdominal tergites are well developed the general effect is blackish. Legs usually blackish, but sometimes paler, especially the tarsi. Halteres blackish. Mesonotal hair blackish. Antennal flagellum with 14–16 segments, which are flask-shaped, with the basal part about as long as broad and neck of moderate length; the four sensoria lanceolate. Fourth segment of front tarsi about half as long again as broad, fifth usually about 2.5 times as long as fourth, but sometimes as little as twice or as much as three times. Wing 3–4 mm.

♂. Rather smaller than ♀ and as in the case of *Xylopriona* differing in having yellow mesonotal hair. Antenna with long necks as in *Xylopriona*. Hypopygium as in fig. 15, c; tergite not very narrow and roots of coxites arising at some distance from base of style.



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FIG. 15.—British *Tetrazyphus*. a. Wing-venation. b. Ovipositor, fully extended. c-e. Hypopygia. f-i. Last two segments of front tarsi of ♂. j-r. Tips of ♀ antennae with separate segments enlarged. a-c, i, j, n, *ater*. f, g, *ater* var. d, h, l, p, *ater* var. ? B. e, k, o, *ater* var. ? A. q, r, *ater* var. ? C.

Numerous specimens examined from various localities in Herts., Beds., Bucks., Oxon., Hants., Devon, Brecon, Argyll, Banff.

The species seems to be subject to a good deal of local and individual variation both in size and in the form of the flagellar segments and front tarsi of the female. The three forms described below are provisionally treated as extreme variants of *T. ater*, but one or more of them may well be distinct species. The group evidently requires intensive study.

T. ater var. ? A.

♀. Flagellum with 20–22 segments, necks markedly longer than in typical *T. ater*, and sensoria also more elongate (fig. 15, k, o). Fifth front tarsal segment four times as long as fourth, which is not much longer than broad.

♂. Hypopygium (fig. 15, e) with bar connecting roots of coxites rather shorter than in typical form; style also slightly different in shape. Last segment of antenna with a small knob or projection at tip (absent in typical *T. ater*).

HERTS.: Hitch Wood, 26.ix.37, 2 ♀♀ 1 ♂ all taken in same spot.

T. ater var. ? B.

♀. Flagellum with 13 segments (Dingwall series) or 16–17 segments (Harpenden series), in either case the segments shorter than in typical *T. ater*, with very short necks and short, almost triangular sensoria (fig. 15, l, p). Fourth front tarsal segment only about as long as broad, fifth four times as long as fourth (fig. 15, h).

♂. Hypopygium (fig. 15, d): bar connecting roots of coxites strongly lobed at each end; style and other parts practically as in typical *ater*.

HERTS.: Harpenden, 7 ♀♀ in light trap (*C. B. Williams*). CROMARTY: Dingwall, series of ♀, 1 ♂ (*J. J. F. X. King*).

T. ater var. ? C.

♀. Differs from the other forms in having yellow mesonotal pubescence. Flagellum with only 12 segments, which are almost oval, without very definite neck, last with nipple-like tip; sensoria short, rather broad, some of them tending to be bilobed, the broadest ones arising from several pores (fig. 15, m, q, r). Fifth segment of front tarsi rather less than twice as long as fourth.

GLOUCESTER: Symond's Yat, ix.36, 1 ♀. OXON.: Oxford Museum, 9.v.23, 1 ♀ (*Hamm*).

Bryomyia Kieff.

Our knowledge of this genus rests hitherto solely on Kieffer's description of the genotype, *B. bergrothi*. In this description Kieffer emphasised chiefly the form of the claws and the long, narrow empodium, features which as it now appears are of minor significance; but he also noted other details, such as the form of the female antenna and the bilobed ninth tergite of the male, which are diagnostic. Kieffer described the flagellar segments of the female as having four sensoria, but his figure in *Genera Insectorum* appears to show only two, which as it now appears must be correct.

From a study of four or more British species I re-define the genus as follows:—

Eyes two or three facets wide at narrowest point. Front indistinctly bilobed. Palpi 4-segmented, first not enlarged, fairly numerous small scales present. Antennae of ♂ 2+12, flagellar segments shaped as in *Cordylomyia* Felt (fig. 11, g), mostly with one complete and oblique crenulate whorl, but last few segments with two complete and less oblique whorls. Antennae of ♀ 2+8, flagellar segments each with *two* sensoria (one on each side) each arising from a single large pore; first segment not longer than second, terminal segment long and constricted in middle.

Mesonotum with longish hairs at sides and in biserial dorsocentral rows, intervening areas almost or quite devoid of hairs (a distinction from most other genera of the group). All tarsal segments with numerous small scales, some similar scales also towards tips of tibiae. Empodium either almost as long as claws (but quite narrow) or rudimentary. Claws smooth but somewhat enlarged before the tip. Last two segments of front tarsi of

♀ subequal. Wings with dense macrotrichia covering the membrane, but in spite of this with few or no macrotrichia on *R*5. Costa produced about two-thirds of the way from *R*5 to *M*; *R*1 twice to three times as long as *rm*, which is not very oblique; *M* somewhat bent downwards near tip, thence running to margin parallel with *R*5; *Cu*2 reaching margin; pore 5 on *rm*.

Hypopygium: tergite variously shaped but always well developed and bilobed; cerci distinct though sometimes hidden under tergite; style large, not infolded, without terminal spine; genital rod small but developed at tip into a pair of strips or loops supporting a bladder-like structure. Spermathecae: two in number, both large, round, thin-walled, resembling the single large spermatheca of *Campylomyza* s.str.

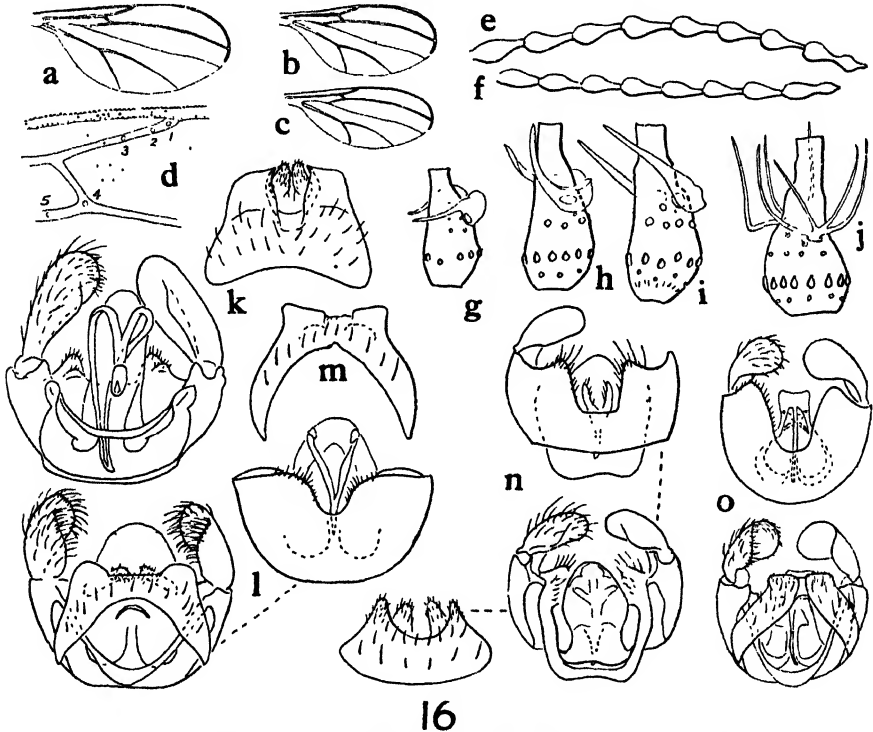


FIG. 16.—British *Bryomyia*. a-c. Wing-venation ($\frac{3}{4}$ scale of other wings shown). d. Enlarged portion of wing to show pores. e, f. Outline of flagellum of ♀. g-j. Single flagellar segments of ♀. k-o. Hypopygia of ♂, tergite in some cases removed and drawn separately (l, m, n to rather larger scale than k and o). a, e, j, k. *trifida*. b-d, f, h, o. *apsectra*. g, l. *bergrothi*. m. *bergrothi* var. i. *apsectra* var.? n. *cambrica*.

***B. trifida* sp. n. (fig. 16, a, e, j, k).**

Mesonotum blackish-brown, not shining, appearing somewhat grey-dusted towards sides when seen from in front; hair pale. Pleura extensively pale, but sternopleura blackish. Legs pale. Empodium narrow, rather more than half as long as claws. Antennae of ♂ with necks from $\frac{1}{2}$ to $\frac{3}{4}$ as long as segments, necks of basal and penultimate segments shorter than those of middle segments. Antennal sensoria of ♀ split to the base into three (occasionally four) slender spreading processes. Hypopygium of ♂ large for the size of the insect; tergite almost rectangular, ending in two truncate bare lobes; coxites fused except for two triangular hairy terminal lobes. Wing with *R*1 about three times as long as *rm*; cubital fork rather acute, *Cu*2 straight. Wing-length 1.7–2.1 mm.

HERTS.: Breachwood Green, 3.v.36, 2 ♂♂; Fisher's Green, 4.v.38, 1 ♂; Letchworth, viii.37, 1 ♀. BEDS.: Milton Bryan, 12.iv.38, 1 ♂. BUCKS.: Ivinghoe, 7.iv.38, 3 ♂♂, 15.v.38, 1 ♀. HANTS.: New Forest, 17.x.37, 1 ♂. SUSSEX: Crowborough, 11.iv.21, 1 ♀ (*Jenkinson*). DEVON: Weston Cliff, Sidmouth, v.36, 1 ♂ (abnormal antennae with only 2 + 9 segments); Clovelly, v.36, 3 ♂♂ including type. MORAYSHIRE: 5.ix.09, 19-24.ix.10, 3 ♂♂ (*Jenkinson*). YORKS.: Mulgrave Woods, Whitby, 16.iv.38, 1 ♂ (*H. Britten, jr.*).

B. bergrothi Kieff. (fig. 16, g, l, m).

Smaller than *B. trifida* and not quite so dark. Empodium narrow and about two-thirds as long as claws. Antennae of ♂ much as in *B. trifida*. Antennal sensoria of ♀ with basal half broad, almost semicircular, distal half narrow, directed transversely. Hypopygium of ♂ relatively smaller than in *B. trifida*; tergite in the form of a rather narrow arch, with two small but broad bare lobes; coxites very extensively fused beneath. Wing with *R*₁ about twice as long as *rm* (slightly less or more); cubital fork rather less acute than in *B. trifida*, *Cu*₂ slightly curved. Wing-length 1.4-1.7 mm.

OXON.: Ditchley, v.37, 1 ♂. DEVON: Clovelly, v.36, 1 ♂. YORKS.: Ravenscar, station window, viii.37, 1 ♂ 1 ♀.

This species agrees fairly well with Kieffer's description and figures except as regards the number of female antennal sensoria, as already noted; the figure of these organs given in *Genera Insectorum* (1913) might represent the same structure as found in the Yorkshire female here figured in a different position, the narrow tip being hidden or foreshortened.

The form of the ninth tergite varies somewhat in the three males examined.

B. apsectra sp. n. (fig. 16, b, c, d, f, h, o).

Very similar to *B. bergrothi* Kieff. as determined above, but differs notably in having the empodium rudimentary. Antennal sensoria of ♀ with basal part rather less broad and distal part rather less slender than in *B. bergrothi*, usually curved with the points directed distally, but apparently variable in this respect. Hypopygium (fig. 16, o) very similar to that of *B. bergrothi*, but differing in several details as illustrated; tergite almost completely divided in middle, lobes finely pubescent. *R*₁ longer than in *B. bergrothi*, 2.5-3 times as long as *rm*, but cubital fork somewhat wider than in *B. trifida*. Wing-length 1.4-1.7 mm.

HERTS.: Hitch Wood, ix.-x.36, swept by shady mossy bank, 14 ♂♂ 7 ♀♀, including types; Sherrard's Wood, 22.x.36 and 23.ix.37, 4 ♂♂ 4 ♀♀; Letchworth, 10.v.17, 1 ♀ on window. BUCKS.: Ivinghoe, 3.x.37, 6 ♂♂ 8 ♀♀. HANTS.: New Forest, 17.x.37, 2 ♂♂. SOMERSET: Quantock Hills, vi.38, 2 ♂♂. DEVON: Sidbury, v.36, 3 ♀♀; Clovelly, v.36, 1 ♀.

A ♀ from Chedworth, Glos., is structurally similar but had the body entirely yellow in life. A male from Letchworth and another from Logie have the hypopygium as in the type but empodia about half as long as claws; a female taken at the same time as this Letchworth male has straight instead of curved sensoria; the wing of the Logie ♂ is markedly narrower than in the type. These variations are perhaps merely individual.

B. cambrica sp. n. (fig. 16, n).

Very similar to *B. bergrothi* as determined above, differing only in the hypopygium (fig. 16, n). Ninth tergite quite different in shape from that of the other three species, broad, with a pair of pointed pubescent processes; sternocoxite more deeply divided than in *B. bergrothi*. Wing-length 1.3 mm.

BRECON: Llangattock, x.37, 1 ♂.

ON A COLLECTION OF LYMANTRIIDAE (HETEROCERA) FROM CHINA

By C. L. COLLENETTE, F.R.E.S.,

WITH PLATE 1.

THIS paper deals with a collection of nearly three thousand LYMANTRIIDAE from China, made by Dr. H. Höne of Shanghai, and forwarded to me by Dr. Martin Hering of the Zoological Museum, Berlin. I am very much indebted to these two gentlemen for their kindness in allowing me to work on these insects.

Three previous collections from the same source have already been dealt with.* The present consignment includes insects from six different Provinces, and not only contains a number of interesting new species, but also numerous examples of known species from hitherto unrecorded districts, providing important information on distribution. I have therefore included in the latter half of the paper a list of the species not discussed in the first part, showing in each case the Provinces in which they were taken.

The localities represented in the collection are as follow :—

North Yunnan : Li-kiang, 8500, 10,000 and 12,000 feet.

Hunan : Hoeng-shan, 900 metres.

Chekiang : West Tien-mu-shan, 1600 metres; and East Tien-mu-shan, Lingan, 1500 metres.

South Shensi : Tapaishan, Tsinling, 1700 and 3000 metres; and Sianfu, Tsinling.

Shantung : Tai-shan, 1550 metres.

Kiangsu : Lungtan Mountains, Nanking; and Shanghai.

The types have been returned to Berlin, while paratypes and duplicate specimens, where available, have kindly been presented to the British Museum (Natural History).

Arctornis l-nigrum Müller, 1764 (pl. 1, fig. 14).

2 ♀♀, Chekiang. Another ♀ from North Yunnan, expanse 53 mm., has a dark antennal shaft and the upper branch of the L mark on the fore-wing obsolete. This insect may represent a local race, but I refrain from naming it until additional material is available.

***Arctornis hemilabda* sp. n.**

♂. Palpus white. Antennal shaft white, pectinations pinkish buff. Head, body and legs white; a line of sepia on the head, joining the bases of the antennae; a spot of sepia proximally on the inner side of the fore-tibia, and on the fore and middle tarsus a spot proximally and another distally on the outer side. Wings above and beneath white; a short streak of sepia on the upperside of the fore-wing, running from the centre of the discocellulars almost to the origin of vein M₂; a narrow line of sepia along the termen on the underside of the fore-wing; fringes white, tipped sparsely with sepia.

♀. Resembles the ♂, but with the pectinations of the antennae pale pinkish buff.

Expanse : 44–48 mm., ♀♀ 48–49 mm.

* 1934, *Stylops* 3 : 113–117; 1936, *Ann. Mag. nat. Hist.* (10) 17 : 329–346; 1936, *Ent. mon. Mag.* 72 : 90–91.

1 ♂ (holotype), 1 ♀ (allotype), and 1 ♂, 1 ♀ (paratypes), June–September 1933, 900 metres, Hoeng-shan, Hunan.

May be separated from *Arctornis l-nigrum* Müller by the absence of dark marking on the palpus, the presence of a line of sepia on the head between the antennae, and the restriction of the L mark on the discocellulars to a short streak.

Redoa Walker.

The British Museum collection contains a large number of insects of this genus from the Indo-Australian region which have not been determined, and which are difficult or impossible to separate into species on external characters. Mr. W. H. T. Tams has kindly made photographs and drawings of the genitalia of nearly 70 males from different localities, which show striking differences, and evidence that many species are involved. With the photographs as a guide, it is usually possible to classify the males by examination with a hand-lens after removing the anal hairs, and without detaching the abdomen. Females are more difficult to separate, and must be distinguished largely by locality.

Species contained in the Hône collection are described below. It is hoped in a subsequent paper to describe and figure other species from the Indo-Australian region, and by this means to clear up a difficult problem.

Redoa anser sp. n. (pl. 1, fig. 16).

This species is indistinguishable in general appearance from *Redoa cygna* Moore (N.E. Bengal), and its supposed synonyms *R. nigricilia* Swinhoe (Khasis) and *R. cymbicornis* Butler (Darjiling). The types of these three are in the British Museum, but unfortunately *R. cygna* and *R. nigricilia* are females and *R. cymbicornis* a male lacking the abdomen. In the circumstances it seems best to restrict the name *Redoa cygna* for the present to insects from N.E. India.

The right clasper and harpe of *R. anser* are illustrated. The harpe broadens towards the tip into a club, slightly dentate on the outer side, and ending in a sharp point, which can be either upturned or straight. The insect is entirely white, excepting for dark brown markings on the head and palpus, spots on the legs and a single spot on the discocellulars of the fore-wing.

Expanse : ♂♂ 44–50 mm.

1 ♂ (holotype) and 11 ♂♂ (paratypes), May and June 1932, 1600 metres, West Tien-mu-shan, Chekiang; 11 ♂♂, Tapaishan, Tsinling, South Shensi.

Redoa anserella sp. n. (pl. 1, fig. 20).

♂. Strongly resembles *Redoa submarginata* Walker (Silhet). The type of *R. submarginata* has unfortunately no abdomen, but specimens from the same locality have a semicircular harpe which runs round the end of the clasper, in a plane at right-angles to the length of the clasper. In the present species the harpe is of equal thickness throughout its length, and runs almost straight along the upper edge of the clasper to its end, but is sometimes bent upwards at the tip. The right harpe and clasper are illustrated.

♀. Resembles the ♂ in external characters.

Expanse : ♂♂ 29–36 mm., ♀♀ 35–43 mm.

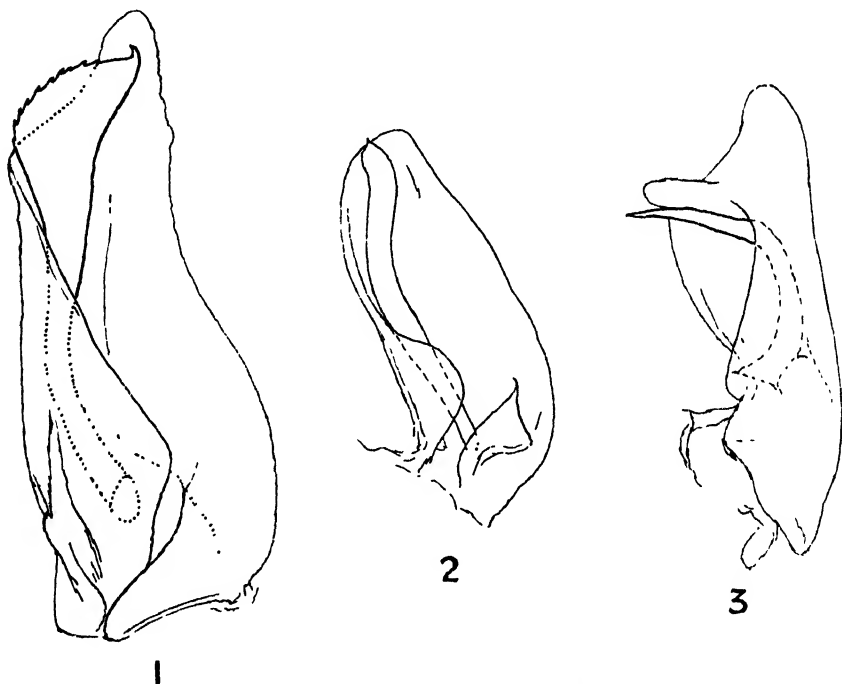
1 ♂ (holotype), 1 ♀ (allotype), 12 ♂♂, 14 ♀♀ (paratypes), 900 metres, April–September 1933, Hoeng-shan, Hunan; also 2 ♂♂, 2 ♀♀, 1600 metres, April–June 1932, West Tien-mu-shan, Chekiang.

***Redoa phaeocraspeda* sp. n. (pl. 1, fig. 7).**

♂. Palpus tawny, on the inner side whitish. Antenna drab. Head tawny to russet, the lower part of the frons whitish. Body and legs whitish, fore and middle legs with a patch of fuscous to Mars brown proximally on the inner side of the tibia, and a further spot proximally on the tarsus; the tarsi tinged with tawny. Fore- and hind-wings, above and beneath, white; surface of the fore-wing on the upperside shiny, of the hind-wing dull; a small but distinct fuscous black spot on the centre of the discocellulars of the fore-wing, sometimes reproduced on the underside; costa of fore-wing, above and beneath, edged narrowly with tawny; fringes of both wings, above and beneath, russet, at the tornus white, the russet in most specimens slightly invading the wing surface.

♀. Resembles the ♂, but with paler antennae, and with less colour on palpus, head, legs and fringes.

Expanse: ♂♂ 28-37 mm.



FIGS. 1-3.—1. *Redoa anser* sp. n. Right harpe and clasper; 2. *Redoa anserella* sp. n. Right harpe and clasper; 3. *Redoa phaeocraspeda* sp. n. Right harpe and clasper.

1 ♂ (holotype), 1 ♀ (allotype), 21 ♂♂, 4 ♀♀, April–October 1933, 900 metres, Hoeng-shan, Hunan.

Resembles *Redoa hipparia* Swinhoe (Singapore). They may be separated on the ♂ genitalia, which differ in several respects; in the present species the clasper is forked, whereas in *R. hipparia* it broadens distally and is unforked.

The ♀♀ may be separated from those of *R. anserella* by the presence of brown on the fringes, brown on the basal portion of the pectinations of the antennae, and veins Rs and M1 of the hind-wing arising separately or from a point, while in *R. anserella* they are shortly stalked.

Euproctis hoenei Collenette, 1934.

44 ♂♂, 1 ♀, Kiangsu. One ♂, which is otherwise normal, has both wings white instead of cartridge buff or pinkish buff.

The ♀, which has not previously been described, resembles the ♂ in markings; expanse 34 mm.

Euproctis melanoma sp. n. (pl. 1, fig. 19).

♂. Palpus fuscous black. Antennal shaft white, pectinations warm buff. Head, thorax, abdomen and legs white; the patagium tinged with light orange-yellow; anal tuft pinkish buff. Wings and fringes, above and beneath, white; on the upperside of fore-wing a narrow fuscous black postmedial fascia, almost straight, running from vein M1 near its origin to the inner margin at just over one half; the basal third of costa on underside of fore-wing edged with fuscous black.

♀. Resembles the ♂.

Expanse: ♂ 33 mm., ♀♀ 39-41 mm.

1 ♂ (holotype), August 1935, 1 ♀ (allotype) and 1 ♀ (paratype), September 1935, Li-kiang, North Yunnan.

Evidently allied to *Euproctis postincisa* Moore, but in the present species vein R2, after leaving the cell, touches the stalk of veins R3 to R5, thus forming a small areole.

Euproctis xuthonepha sp. n. (pl. 1, fig. 12).

♂. Palpus pale yellow orange, lighter at the tip. Antennal shaft white, pectinations pinkish buff. Thorax pale yellow-orange. Abdomen fuscous black; the basal segments pale pinkish buff, this colour in some specimens continued dorsally to the anal tuft, which is ochraceous buff. Pectus and legs whitish, venter fuscous black. Fore-wing pale yellow-orange, the costal area lighter; a broad orange buff antemedial fascia, the edges ill-defined, running from just below the costa to the inner margin; a broad orange buff postmedial fascia, the edges ill-defined, running from costa to inner margin, roughly parallel with the termen; fringe pale yellow orange. Hind-wing and fringe cartridge buff to cream buff. Underside of both wings and fringes cartridge buff, the fore-wing rather lightly tinged with cream buff.

Expanse: ♂♂ 34-36 mm.

1 ♂ (holotype) and 10 ♂♂ (paratypes), June 1935 and 1936, 1 ♂ (paratype), August 1936, 3000 metres, Tapaishan, Tsinling, South Shensi.

May be placed near to *Euproctis hoenei* Collenette.

Euproctis leucozona sp. n. (pl. 1, fig. 15).

♂. Palpus pinkish buff, on the outer side Prout's brown. Antennal shaft pale pinkish buff, pectinations pinkish buff. Head, thorax and basal segments of abdomen pale orange-yellow to light buff, remainder of abdomen bone brown, anal tuft orange buff. Pectus, venter and legs pale pinkish buff to pinkish buff. Fore-wing and fringe maize yellow; some sparse fuscous black irroration medially in the inner marginal area, above and below the anal vein, and not extending to the long hair-scales on the margin. Hind-wing and fringe pale pinkish buff. Underside of both wings and fringes pale pinkish buff, the costal and apical areas of the fore-wing tinged with maize yellow, and the base of the costa edged with Prout's brown.

♀. Resembles the ♂, but the Prout's brown at the base of the costa on the underside of fore-wing entirely absent in the type and the majority of other specimens.

Expanse: ♂♂ 41-45 mm., ♀♀ 50-54 mm.

1 ♂ (holotype), 1 ♀ (allotype), 1 ♀ (paratype), Siao-lou, 1896 and 1903; 2 ♀♀, Tsekou, 1898; 1 ♀, Tien-Tsuen, 1903; all Prov. Szechwan, British Museum collection, *ex* Oberthür collection. Also 1 ♂, July 1935, Likiang, Yunnan, and 1 ♀, July 1935, Tapaishan, South Shensi.

Resembles *Euproctis montis* Leech, described from Chang Yang, but larger and brighter, and with the irroration on the fore-wing confined to the area above and below the anal vein.

***Euproctis mesostiba* sp. n. (pl. 1, figs. 8, 10).**

♂. Palpus warm buff, on the outer side buffy brown. Antennal shaft clay colour, pectinations tawny olive. Body and legs light orange-yellow. Fore-wing light orange-yellow; a broad medial fascia of wood brown, irrorated sparsely with sepia, not quite reaching the costa, and in the majority of specimens not reaching the inner margin; on the distal margin of the fascia a rounded projection between veins M2 to Cu1; some light metallic scales, placed interneurally, midway between the discocellulars and the termen, visible only in fresh specimens; fringe light orange-yellow. Hind-wing pale orange-yellow, the fringe somewhat lighter. Underside of both wings, and fringes, pale orange-yellow; on the fore-wing a large rounded patch of wood brown, its centre slightly on the distal side of the discocellulars.

♀. Resembles the ♂, but with the fascia on the fore-wing less prominent, and the patch of wood brown on the underside of the fore-wing either absent or very faintly indicated.

Expanse: ♂♂ 21–28 mm., ♀♀ 29–38 mm.

1 ♂ (holotype), 1 ♀ (allotype), 25 ♂♂ and 12 ♀♀ (paratypes), April–September 1933, Lungtan, near Nanking, Kiangsu.

Superficially resembles *Euproctis tetrachroma* Joannis. Vein M3 is absent in the hind-wing.

***Euproctis hunanensis* sp. n. (pl. 1, fig. 9).**

♂. Palpus pale yellow-orange, marked on the outer side with ochraceous tawny. Antenna pinkish buff. Head, thorax and base of abdomen pale orange-yellow to light orange-yellow, remainder of abdomen, pectus, venter and legs light buff to warm buff. Fore-wing pale orange-yellow; basal two-thirds of wing, excepting for a strip along the costa, wood brown irrorated with sepia, and with a narrow antemedial fascia, of pale orange-yellow, running oblique outwardly across the cell, thence straight and slightly oblique inwardly to the inner margin; the distal margin of the wood brown area is roughly parallel to the termen, with an isolated spot of the same colour subterminally between veins R5 and M1, a projection between veins M3 and Cu1 which almost reaches the termen, and a further projection above and below the anal vein which reaches the tornus; fringe light buff. Hind-wing and fringe light buff, the inner marginal area of the wing tinged with warm buff. Underside of both wings and fringes light buff.

Expanse: ♂♂ 29–31 mm.

1 ♂ (holotype), and 1 ♂ (paratype), September 1933, 900 metres, Hoengshan, Hunan.

Somewhat resembles *Euproctis piperita* Oberthür, but possesses vein M2 in the hind-wing.

***Euproctis niphonis* Butler, 1881.**

1 ♂, 1 ♀, South Shensi. This pair is larger than Japanese and Usuri specimens (♂ 48 mm., ♀ 52 mm.), the termen of the fore-wing is less rounded, and the ground colour of both wings in the ♀ light buff rather than yellow.

Euproctis scintillans Walker, 1856.

8 ♂♂, 7 ♀♀, Hunan; 13 ♂♂, 3 ♀♀, South Shensi; 1 ♂, Chekiang. The insects in the series from Hunan are darker and usually smaller than those from South Shensi.

Euproctis marginata Moore, 1879.

1 ♂, 1 ♀, North Yunnan. The ♂ is intermediate between the typical form and form *E. marginata diffusefasciata* Gaede, 1932.

Lymantria mathura Moore, 1865, and ♂ form *fusca* Leech, 1888.

1 ♂, Shensi; 29 ♂♂, 2 ♀♀, Chekiang. The ♂♂ from Chekiang show a full gradation in colour of wings from the very dark form *fusca* Leech to a specimen approaching the normal ♂ with yellow hind-wing.

Lymantria nebulosa Wileman, 1910.

2 ♂♂, Hunan; 15 ♂♂, 8 ♀♀, Kiangsu; 3 ♂♂, 3 ♀♀, Chekiang. Average specimens are smaller than those from Formosa, but the differences are not sufficient to allow separation.

Laelia pantana sp. n. (pl. 1, figs. 17, 18).

♂. Palpus drab, on the outer side darker. Antenna hair brown. Head, thorax above and beneath, and legs drab. Abdomen above and beneath pale pinkish buff. Fore-wing Saccardo's umber, mixed with pale pinkish buff in the cell and the area from the cell to the inner margin; a postmedial series of seven fuscous black interneural spots, the one between veins M2 and M3 more proximad than those above and below; fringe Saccardo's umber. Hind-wing and fringe whitish. Underside of fore-wing and fringe drab, the area between the cell, vein Cu2 and the inner margin drab. Underside of hind-wing, and fringe, whitish; a faint line of cinnamon buff along the termen, extending to the costa.

♀. Wings and fringes white, the veins on the upperside thinly scaled and therefore easily visible.

Expanse: ♂♂, 39-42 mm., ♀, 42 mm.

1 ♂ (holotype) and 1 ♀ (allotype), 2000 metres, July, Liu-pin-schan, Tsing-schui, Kansu, in British Museum collection; 6 ♂♂ (paratypes), 1700 metres, July 1936, Tapaishan, Tsinling, South Shensi.

A very distinct species, superficially resembling *Pantana baswana* Moore.

Laelia lilacina Moore, 1884.

2 ♂♂, Hunan; 3 ♂♂, 1 ♀, Kiangsu. The spots on the fore-wing of the ♂ are less prominent, and the colour of the hind-wing lighter, than in the type from the Nilgiris.

Dasychira leucomene sp. n. (pl. 1, fig. 2).

♂. Palpus pinkish buff, on the outer side mummy brown. Antennal shaft tilleul buff, irrorated with mummy brown; pectinations tawny. Head, thorax, abdomen and legs tilleul buff mixed with pinkish buff and mummy brown, the tarsi banded with mummy brown.

Fore-wing tilleul buff mixed with Brussels brown, and with the following pattern in the latter colour: an irregular subbasal fascia; an antemedial fascia, crenate, concavities basad, running at right angles to the inner margin; a mark on the discocellulars, roughly crescent-shaped, convexity basad, tilleul buff edged with Brussels brown; a crenate postmedial fascia, concavities terminad, bowed from costa to vein Cu2, thence slightly oblique outwardly to the inner margin; a crenate preterminal fascia, indistinct in some specimens; fringe tilleul buff, with a series of prominent mummy brown spots interneurally. Hind-wing drab; a darker mark on the discocellulars, and an incomplete postmedial fascia parallel with the termen; fringe lighter than the wing, with a series of dark spots interneurally. Underside of both wings tawny olive, with a mummy brown mark on the discocellulars, and with traces of a postmedial fascia on the hind-wing; fringes lighter than the wings, with a series of small mummy brown spots interneurally at the base.

Expanse: ♂♂, 44–51 mm.

1 ♂ (holotype) and 7 ♂♂ (paratypes), September 1935, Li-kiang, North Yunnan.

Related to *Dasychira wilemani* Collenette, but a larger insect with relatively broader wings.

Dasychira complicata Walker, 1865.

19 ♂♂, South Shensi. These ♂♂ have a lighter fore-wing than Indian specimens, and the hind-wing is less deeply tinged with yellow.

Dasychira phloeobares sp. n. (pl. 1, fig. 1).

♂. Palpus tawny olive, on the outer side bistre. Antennal shaft bistre, the pectinations snuff brown. Head and thorax bistre. Abdomen tawny olive, with basal dorsal tufts of bistre. Pectus, venter and legs tawny olive, mixed on fore and middle legs with bistre. Fore-wing pinkish buff, irrorated heavily with bistre; some bistre markings subbasally; a bistre antemedial fascia, outwardly oblique from the costa to the centre of the cell, thence dividing into two and running inwardly oblique and almost straight to the inner margin; a crescent-shaped mark on the discocellulars, concavity terminad; a bistre postmedial fascia, double throughout, running almost straight and parallel with the termen from the costa at two-thirds to below vein Cu2, thence curving outwardly to the inner margin at three-fourths; a rather prominent bistre subterminal fascia, broken at some of the veins; fringe pinkish buff mixed with bistre. Hind-wing tawny olive mixed with Saccardo's umber, a dark spot on the discocellulars and a broad dark postmedial fascia; fringe tawny olive. Underside of both wings tawny olive mixed with Saccardo's umber; a dark spot on the discocellulars and a straight postmedial fascia, the latter on the hind-wing being double; fringe of both wings pinkish buff, Saccardo's umber between the vein-ends.

♀. Resembles the ♂, but apparently lacking the dorsal tufts at the base of the abdomen.

Expanse: ♂ 42 mm., ♀ 48 mm.

1 ♂ (holotype) and 1 ♀ (allotype), June and September 1933, Lungtan, near Nanking, Kiangsu; 1 ♂, May 1936, 1700 metres, Tapaishan, Tsinling, South Shensi.

The arrangement of the fasciae in the fore-wing somewhat resembles *D. polysphena* Collenette. Most nearly related to *Dasychira conjuncta* Wileman, from which it can be readily separated by the shape of the postmedial fascia in the fore-wing.

***Dasychira chekiangensis* sp. n. (pl. 1, fig. 5).**

♂. Palpus snuff brown. Antennal shaft snuff brown, pectinations sayal brown. Head and thorax sayal brown, mixed on the tegula with bistre. Abdomen pinkish buff mixed with snuff brown, and with fuscous black dorsal tufts on the basal segments. Pectus, venter and legs sayal brown, the legs marked on the outer side with bistre. Fore-wing bistre, dusted with pale violet plumbeous; a fuscous antemedial fascia, slightly bowed (concavity basad) almost to the anal vein, thence outwardly oblique to the inner margin; a conspicuous patch of sayal brown on the discocellulars, extending upwards to the costa and crossing the postmedial fascia; a further patch of sayal brown along the inner margin from the antemedial to the postmedial fascia; a fuscous postmedial fascia, crenate, points on the veins, concavities basad, slightly bowed from costa to vein Cu₂, thence running at right angles to the inner margin; a sayal brown subterminal fascia, corresponding to the postmedial fascia in form; fringe bistre, lighter at the vein-ends. Hind-wing and fringe drab, with traces of darker postmedial and subterminal fasciae. Underside of fore-wing drab, a darker shade in the cell and an almost straight postmedial fascia; fringe bistre, lighter at the vein-ends. Underside of hind-wing drab; a dark spot on the discocellulars, a postmedial fascia almost parallel with the termen, and some dark spots midway between the postmedial fascia and the termen; fringe drab.

Expanse: ♂♂ 34–41 mm.

1 ♂ (holotype) and 9 ♂♂ (paratypes), May and June 1932, 1600 metres, West Tien-mu-shan, Chekiang.

May be placed near to *Dasychira glaucinoptera* Collenette and *D. planozona* Collenette.

***Dasychira anophoeta* Collenette, 1936.**

38 ♂♂, 4 ♀♀ (including neallotype ♀), North Yunnan. The ♀ strongly resembles the ♂, but has a darker hind-wing.

***Dasychira chinensis hunanensis* subsp. n. (pl. 1, fig. 4).**

♂. Easily distinguished from *D. chinensis chinensis* Swinhoe by the lilac grey coloration in the postmedial and terminal areas of the fore-wing, and by the appearance of the fringes, which on the upperside of both wings are Prout's brown, marked with tilleul buff at the vein-ends.

Expanse: ♂♂ 42–50 mm.

1 ♂ (holotype) and 15 ♂♂ (paratypes), 900 metres, May–August 1933, Hoeng-shan, Hunan; also 1 ♂, August 1932, 1600 metres, West Tien-mu-shan, Chekiang; and, in the British Museum collection, 1 ♂, June–July 1890, Kweichow, ex Leech collection.

***Dasychira nox* sp. n. (pl. 1, figs. 3, 6).**

♂. Palpus tawny olive, on the outer side sepia. Antenna, head, body and legs sepia to bistre. Fore-wing sepia; a faintly indicated darker streak on the discocellulars; a dark postmedial fascia, slightly bowed, concavity terminad, from costa to vein Cu₂, thence running at right angles to the inner margin; fringe sepia, with a few pinkish buff scales at the ends of the veins. Hind-wing bistre, the fringe somewhat lighter; a light streak in the basal half of the costal area. Underside of both wings, and fringes, bistre, with faintly indicated darker marks on the discocellulars, and with postmedial and sub-terminal fasciae.

♀. Lighter in colour than the ♂, with two whitish patches on the costa of the fore-wing, one antemedial and the other postmedially.

Expanse: ♂♂ 34-39 mm., ♀ 44 mm.

1 ♂ (holotype), 1 ♀ (allotype), and 4 ♂♂ (paratypes), April 1933, 900 metres, Hoeng-shan, Hunan.

The ♂ somewhat resembles *Dasychira moerens* Felder, but has considerably narrower wings.

Dasychira jankowskii glaucoptera Collenette.

94 ♂♂, 1 ♀, Hunan; 20 ♂♂, South Shensi; 8 ♂♂, Kiangsu; 1 ♂, Chekiang. The insects in the series from Kiangsu are darker and smaller (average expanse 31 mm.) than those from the other localities, although two or three specimens in the Hunan series are not separable from them.

Dasychira locuples Walker, 1855 (pl. 1, fig. 13).

86 ♂♂, 4 ♀♀, Hunan; 64 ♂♂, 1 ♀, South Shensi; 1 ♂, Kiangsu; 5 ♂♂, Chekiang.

In addition to the above, a series from North Yunnan is composed of insects appreciably larger and lighter than those from the other localities, the colour of the fore-wing being raw sienna, and the expanse of the ♂♂ varying between 44 and 47 mm., with an average of over 45 mm. The average expanse of *D. locuples locuples* Walker from Hunan and Shensi is about 38 mm. Moreover, in the North Yunnan examples, the inner and outer edges of the antemedial fascia meet or almost meet where they join the inner margin, while in the specimens from other areas the edges are almost parallel. I name this insect, which appears to be a local race, *Dasychira locuples yunnanensis* subsp. n. 1 ♂ (holotype) and 17 ♂♂ (paratypes), July-September 1935, Li-kiang, North Yunnan.

Numenes disparilis separata Leech, 1890.

25 ♂♂, South Shensi. The series is uniform, excepting that the white spot near the base of the costa in the fore-wing is rather large in some specimens and almost obsolete in others.

Locharna strigipennis Moore, 1879.

6 ♂♂, 27 ♀♀, Kiangsu; 1 ♀, Chekiang. The fore-wing in both sexes is slightly broader, and the apex less pointed, than in Indian specimens.

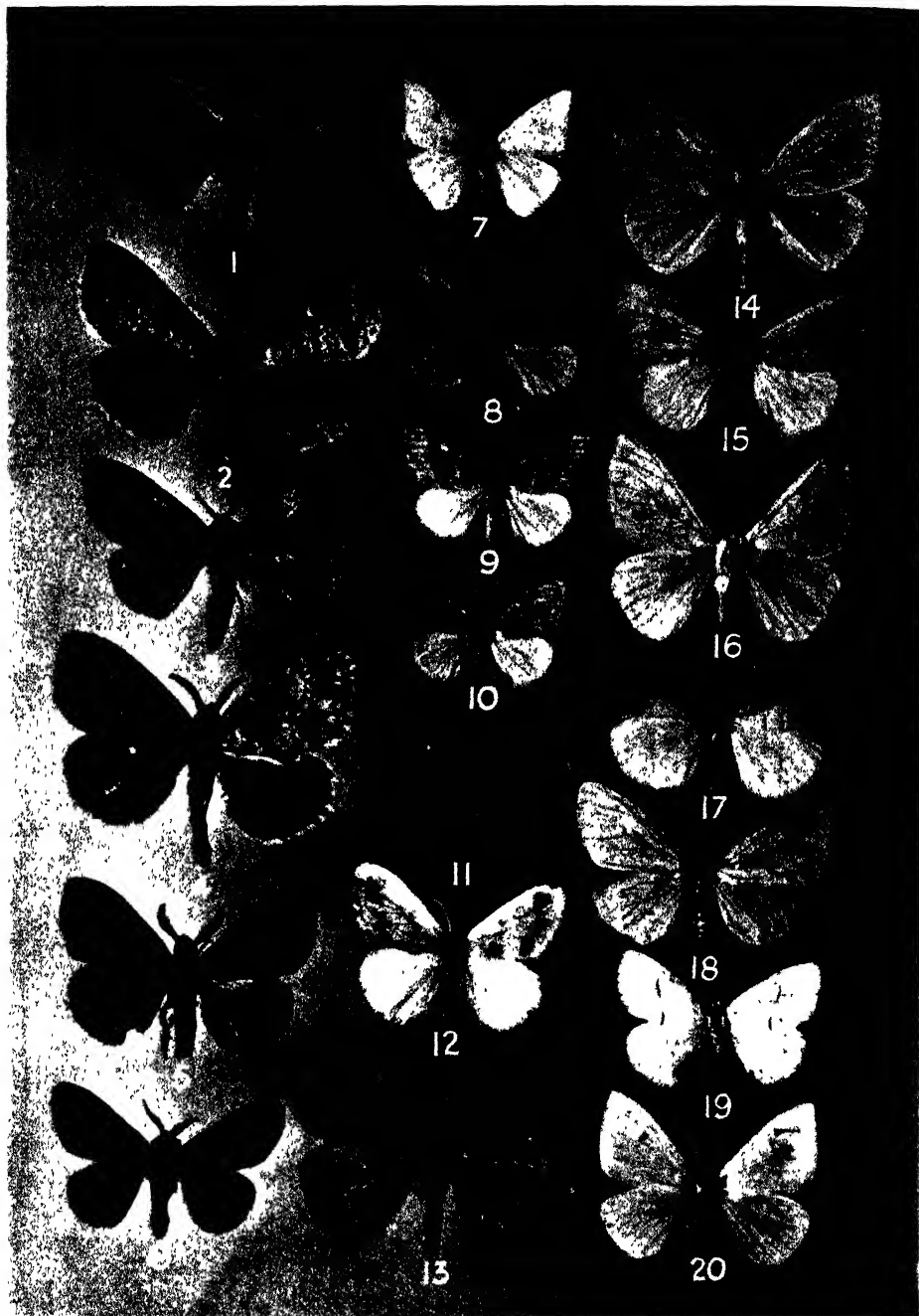
Orgyia convergens sp. n. (pl. 1, fig. 11).

♂. Strongly resembles *Orgyia parallela* Gaede, but much smaller and with the antemedial and postmedial fasciae of the fore-wing converging at veins Cu1 and Cu2. The white tornal spot on the fore-wing is small, and there is no trace of pale grey at the centre of the costa.

Expanse: ♂♂ 26-29 mm.

1 ♂ (holotype) and 3 ♂♂ (paratypes), July and August 1905 and 1907, Peitaiho, Yunnan, British Museum ex Joicey collection; 1 ♂, June 1936, Sianfu, Tsinling, South Shensi.

- Leucoma salicis candida* Staudinger, 1892. 1 ♂, 1 ♀, Hunan; 31 ♂♂, 3 ♀♀, North Yunnan; 16 ♂♂, 5 ♀♀, South Shensi; 4 ♂♂, 2 ♀♀, Kiangsu.
- Leucoma chrysoscela* Collenette, 1934. 2 ♀♀, Chekiang.
- Leucoma sericea horridula* Collenette, 1934. 8 ♀♀, Chekiang.
- Caragolina costalis* Moore, 1879. 3 ♂♂, North Yunnan.
- Arctornis gelasphora* Collenette, 1935. 37 ♂♂, 37 ♀♀, North Yunnan.
- Arctornis cecconimena* Collenette, 1935. 2 ♀♀, North Yunnan.
- Redoa alba* Bremer, 1861. 31 ♂♂, 46 ♀♀, Kiangsu.
- Redoa cygnopsis* Collenette, 1934. 3 ♂♂, 3 ♀♀, Hunan.
- Redoa diaphora* Collenette, 1934. 2 ♂♂, Hunan; 1 ♂, Chekiang.
- Ivela auripes* Butler, 1877. 1 ♂, 6 ♀♀, South Shensi.
- Euproctis similis* Fuessly, 1775. 17 ♂♂, 18 ♀♀, Hunan; 4 ♂♂, 17 ♀♀, South Shensi; 38 ♂♂, 32 ♀♀, Kiangsu.
- Euproctis bigutta* Walker, 1855. 1 ♂, Chekiang.
- Euproctis glaphyra* Collenette, 1935. 7 ♂♂, North Yunnan.
- Euproctis varians* Walker, 1855. 1 ♂, Shantung; 21 ♂♂, 37 ♀♀, Kiangsu.
- Euproctis coniptera* Collenette, 1934. 2 ♂♂, Kiangsu; 3 ♂♂, 1 ♀, Chekiang.
- Euproctis conistica* Collenette, 1935. 44 ♂♂, 5 ♀♀, North Yunnan.
- Euproctis montis* Leech, 1890. 29 ♂♂, 12 ♀♀, South Shensi; 2 ♀♀, Chekiang.
- Euproctis torasan* Holland, 1889. 4 ♂♂, Hunan.
- Euproctis brachyclaena* Collenette, 1935. 5 ♂♂, North Yunnan.
- Euproctis subflava* Bremer, 1864. 11 ♂♂, 6 ♀♀, Hunan; 1 ♂, 1 ♀, South Shensi; 91 ♂♂, 13 ♀♀, Kiangsu; 7 ♂♂, Chekiang.
- Euproctis flavinata* Walker, 1865. 9 ♂♂, 23 ♀♀, Hunan; 19 ♂♂, 23 ♀♀, Kiangsu.
- Euproctis fraterna* Moore, 1883. 1 ♂, Hunan.
- Euproctis electrophaes* Collenette, 1935. 1 ♂, 1 ♀, North Yunnan.
- Euproctis angulata* Matsumura, 1927. 2 ♂♂, Hunan; 1 ♂, Chekiang.
- Euproctis pseudoconspersa* Strand, 1923. 2 ♂♂, 1 ♀, Chekiang.
- Euproctis flavotriangulata* Gaede, 1932. 1 ♂, 3 ♀♀, South Shensi.
- Euproctis nigrifulva* Gaede, 1932. 5 ♂♂, 1 ♀, North Yunnan.
- Euproctis varia* Walker, 1855. 2 ♂♂, North Yunnan.
- Euproctis piperita* Oberthür, 1880. 12 ♂♂, 6 ♀♀, Hunan; 202 ♂♂, 21 ♀♀, South Shensi.
- Euproctis bipunctapex* Hampson, 1891. 2 ♀♀, Hunan; 8 ♂♂, 6 ♀♀, Kiangsu.
- Euproctis plana* Walker, 1856. 4 ♂♂, 2 ♀♀, Hunan.
- Medama diplaga* Hampson, 1910. 10 ♂♂, North Yunnan.
- Topomesoides jonassii* Butler, 1877. 7 ♂♂, Hunan; 1 ♀, Chekiang.
- Lymantria monacha* Linnaeus, 1758. 7 ♂♂, Chekiang.
- Lymantria concolor lacteipennis* Collenette, 1933. 3 ♂♂, 1 ♀, South Shensi; 1 ♂, Chekiang.
- Lymantria marginata* Walker, 1855. 11 ♀♀, South Shensi.
- Lymantria serva* Fabricius, 1793. 25 ♂♂, 5 ♀♀, North Yunnan; 2 ♀♀, South Shensi; 3 ♂♂, Chekiang.
- Lymantria servula* Collenette, 1935. 1 ♂, North Yunnan.
- Lymantria dispar asiatica* Vnukovskij, 1926. 2 ♂♂, South Shensi; 9 ♂♂, 1 ♀, Kiangsu.
- Lymantria nigriplagiata* Gaede, 1932. 1 ♂, 1 ♀, Shanghai; 3 ♂♂, 3 ♀♀, Kiangsu; 1 ♀, Chekiang.
- Lymantria dissoluta* Swinhoe, 1903. 30 ♂♂, 32 ♀♀, Hunan; 5 ♂♂, 8 ♀♀, Kiangsu.
- Lymantria argyrochroa* Collenette, 1935. 2 ♂♂, 1 ♀, North Yunnan.
- Lymantria furva* Leech, 1888. 12 ♂♂, 2 ♀♀, Hunan; 4 ♀♀, South Shensi; 2 ♂♂, Shantung.
- Laelia coenosa candida* Leech, 1899. 10 ♂♂, 15 ♀♀, Kiangsu.
- Laelia coenosa sangaica* Moore, 1877. 3 ♂♂, 7 ♀♀, Kiangsu.
- Laelia anamesa* Collenette, 1934. 13 ♂♂, 17 ♀♀, Hunan; 1 ♀, Kiangsu.
- Laelia monoscota* Collenette, 1934. 1 ♂, Chekiang.



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Chinese Lymantriidae.

- Dasychira axutha* Collenette, 1934. 32 ♂♂, 11 ♀♀, Hunan; 1 ♂, 1 ♀, South Shensi; 1 ♀, Kiangsu; 4 ♂♂, 1 ♀, Chekiang.
- Dasychira grotei* Moore, 1859. 33 ♂♂, 1 ♀, Hunan.
- Dasychira virginea* Oberthür, 1879. 7 ♂♂, 2 ♀♀, South Shensi; 1 ♂, Kiangsu.
- Dasychira lunulata* Butler, 1877. 5 ♂♂, 2 ♀♀, South Shensi; 1 ♂, 1 ♀, Chekiang.
- Dasychira oxygnatha* Collenette, 1936. 10 ♂♂, North Yunnan; 5 ♂♂, South Shensi.
- Dasychira strigata* Moore, 1879. 4 ♂♂, North Yunnan; 52 ♂♂, 4 ♀♀, South Shensi; 2 ♂♂, Chekiang.
- Dasychira angulata* Hampson, 1895. 1 ♂, 1 ♀, Hunan; 1 ♀, Chekiang.
- Dasychira hoeneri* Collenette, 1935. 6 ♂♂, 1 ♀, North Yunnan.
- Dasychira simiolus* Collenette, 1935. 2 ♂♂, 1 ♀, North Yunnan.
- Dasychira polysphena* Collenette, 1935. 2 ♀♀, North Yunnan.
- Dasychira planozona* Collenette, 1935. 2 ♀♀, North Yunnan; 2 ♂♂, South Shensi.
- Dasychira feminula feminula* Hampson, 1891. 3 ♂♂, South Shensi; 21 ♂♂, 2 ♀♀, Chekiang.
- Dasychira feminula likiangensis* Collenette, 1935. 70 ♂♂, North Yunnan.
- Dasychira flavimacula* Moore, 1865. 2 ♂♂, North Yunnan; 1 ♀, South Shensi.
- Dasychira tenebrosa* Walker, 1865. 10 ♂♂, North Yunnan; 1 ♂, South Shensi.
- Dasychira nachiensis* Marumo, 1917. 3 ♀♀, North Yunnan; 8 ♀♀, Chekiang.
- Dasychira psolobalia* Collenette, 1935. 2 ♂♂, 1 ♀, North Yunnan.
- Dasychira pilodes* Collenette, 1935. 10 ♂♂, 13 ♀♀, North Yunnan.
- Dasychira melli* Collenette, 1934. 4 ♂♂, 4 ♀♀, Hunan; 6 ♂♂, Chekiang.
- Psalis pennatula* Fabricius, 1793. 5 ♂♂, 1 ♀, North Yunnan.
- Pseudodura dudgeoni* Swinhoe, 1907. 16 ♂♂, Chekiang.
- Numenes disparilis* Staudinger, 1887. 1 ♀, Chekiang.
- Pantana delineata* Walker, 1855. 2 ♀♀, Kiangsu.
- Pantana sinica* Moore, 1877. 5 ♂♂, 1 ♀, Hunan.
- Pantana pluto* Leech, 1890. 1 ♂, Hunan.
- Orygia ericae leechi* Kirby, 1892. 22 ♂♂, South Shensi.
- Orygia gonostigma approximans* Butler, 1881. 1 ♂, South Shensi.

EXPLANATION OF PLATE 1.

- FIG. 1. *Dasychira phloeobares* sp. n., holotype ♂. (p. 217.)
2. *Dasychira leucomene* sp. n., holotype ♂. (p. 216.)
3. *Dasychira nox* sp. n., allotype ♀. (p. 218.)
4. *Dasychira chinensis hunanensis* subsp. n., holotype ♂. (p. 218.)
5. *Dasychira chekiangensis* sp. n., holotype ♂. (p. 218.)
6. *Dasychira nox* sp. n., holotype ♂. (p. 218.)
7. *Redoa phaeocraspeda* sp. n., holotype ♂. (p. 213.)
8. *Euproctis mesostiba* sp. n., allotype ♀. (p. 215.)
9. *Euproctis hunanensis* sp. n., holotype ♂. (p. 215.)
10. *Euproctis mesostiba* sp. n., holotype ♂. (p. 215.)
11. *Orygia convergens* sp. n., holotype ♂. (p. 219.)
12. *Euproctis xuthonepha* sp. n., holotype ♂. (p. 214.)
13. *Dasychira locuples yunnanensis* subsp. n., holotype ♂. (p. 219.)
14. *Arctornis hemilabda* sp. n., holotype ♂. (p. 211.)
15. *Euproctis leucozona* sp. n., holotype ♂. (p. 214.)
16. *Redoa anser* sp. n., paratype ♂. (p. 212.)
17. *Laelia pantana* sp. n., holotype ♂. (p. 216.)
18. *Laelia pantana* sp. n., allotype ♀. (p. 216.)
19. *Euproctis melanoma* sp. n., holotype ♂. (p. 214.)
20. *Redoa anserella* sp. n., holotype ♂. (p. 212.)

ON A FURTHER TWO NEW PALAEARCTIC SPECIES OF *APANTELES* (HYM. BRAC.)

By D. S. WILKINSON, F.R.E.S.

(Imperial Institute of Entomology.)

THESE two new interesting species will not agree with the original description of any described palaeartic species, by far the greater majority of the types of which, incidentally, are known to me. They are published at this time especially to preclude the necessity of describing them as new in the monograph that I have in preparation, but also to make the names available for my many kind correspondents.

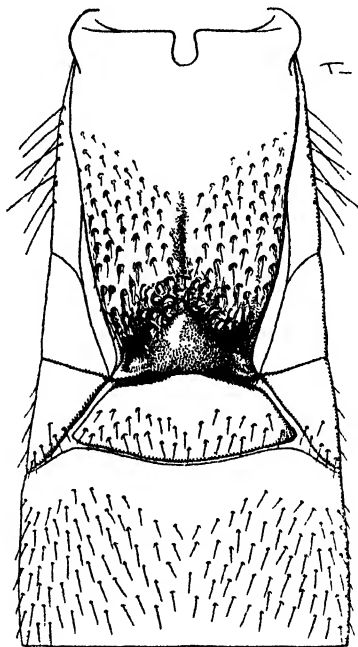


FIG. 1.—*Apanteles dioryctriae* sp. n., basal tergites, ♀. × 80.

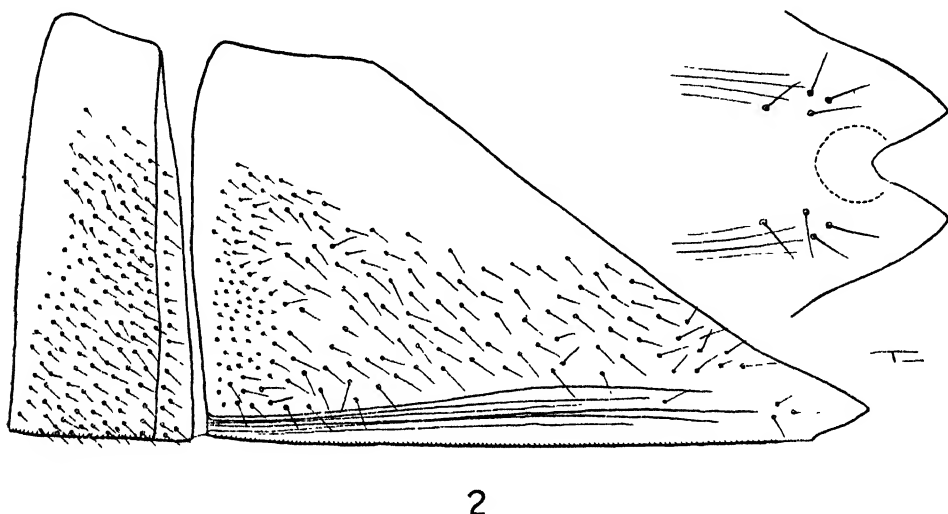
Apanteles dioryctriae sp. n.

♀. Black; certain portions of the front trochanters and trochantines, front femora in apical half (except perhaps above and below), front tibiae (save along outer margin), front tarsi (save for darkened apical joint and feet), middle and hind tibiae in basal fifth, testaceous or red testaceous; palpi pale; tibial spurs pale or white; wings infumated, the setae coloured; wing-veins, stigma, and metacarp, brown, the costal veins basally to a small extent testaceous; stigma uniformly opaque.

♂. Agrees closely with above colour-description of ♀, but rather variable in colour of legs; many specimens as in ♀, others with the legs darker and with the extent of the testaceous markings smaller, some few even with the legs apparently entirely darkened or black.

PROC. R. ENT. SOC. LOND. (B) 7. PT. 10. (OCT. 1938.)

♀♂. *Head*: face, clypeus, frontal orbits, frons, and vertex, throughout regularly, minutely punctate (degree 1); facial depressions just nearer to apex of clypeus than to the eyes; posterior ocelli equidistant from each other and the eyes; flagellum of ♀ about equal to combined length of thorax and abdomen, of ♂ equal to combined length of head, thorax, and abdomen. *Thorax*: mesonotum and disc of scutellum throughout regularly, minutely punctate (degree 1) and with the lines of the notauli not indicated; the non-excavate area of lateral faces of scutellum small and hardly reaching up half-way to base of scutellum;



2

FIG. 2.—*Apanteles dioryctriae* sp. n., apical ventrites, ♀: side view, $\times 80$; and apex of hypopygium, opened out, dorsal view, further much enlarged, to show apical slit.

propodeon largely entirely smooth, minutely punctate (degree 1) in the basal half (save medianly), sometimes weakly aciculate laterally in apical half, and invariably with a mass of short, weak carinae radiating from the median apical lunule. *Wings*: 1st abscissa of radial somewhat longer than, and strongly angled with, the transverse cubital, these veins swollen at their point of junction, or even with a vestigial 2nd abscissa of radial; metacarp longer than stigma. *Legs*: hind coxae basally above with a large group of ill-defined, closely placed punctures (degree 3), apically above minutely punctate (degree 1), and on outer faces with widely separated minute punctures (degree 1); the longer hind tibial spur somewhat longer, and the shorter spur somewhat shorter, than half the length of the basal segment of the hind tarsus (18:14:32). *Abdomen* (figs. 1–3): 1st tergite in basal half excavate and smooth save for some indefinite sculpture laterally, medianly smooth and not tumescent, in apical half turned over and broadly punctate (degree 2) down sides and medianly very slightly depressed, at apex strongly contracted and the apical angles deeply depressed, the median apical lunule delimited by weak rugosity; 2nd tergite minutely punctate (degree 1) in at least apical half, and with well-marked sulci, otherwise entirely smooth; 3rd tergite entirely smooth broadly across base and in a median basal triangle, and narrowly across apex, otherwise minutely punctate; succeeding tergites minutely punctate; majority of ventrites of ♀ with median longitudinal suture; hypopygium more or less broadly membranous throughout the median line, and its apex membranously acute; ovipositor sheaths longer than hind tarsus, about equal to or just a little longer than combined length of hind tibia and basal segment of hind tarsus, the ovipositor longer

than combined length of hind tibia and hind tarsus, somewhat longer than combined length of hind femur, hind tibia, and the two basal segments of the hind tarsus.

Length : ♀, 3.0–3.5 mm.; ♂, 2.5–3.5 mm.

Described from the following material:—IMPERIAL INSTITUTE OF ENTOMOLOGY : Morocco, Ifrane, 18 ♀♀ (one the *type*), 6 ♂♂, 19.viii.–10.x.1937 (*J. M. Mimeur*), Ifrane, St. B.V. 1650 m., 12 ♀♀, 18 ♂♂, 1^{ère}-quinz. x.1936 (*J. M. Mimeur*).

Type deposited in the British Museum.

Host. The host of this species is recorded to be the Pyralid *Dioryctria peyerimhoffi* de Joann., mining in young cones of the cedar, *Cedrus atlantica*. In his covering letter, when he sent his material, M. Mimeur said : “ Lors de quelques séjours effectués cet été à la Station de Biologie végétale d'Ifrane, j'ai remarqué dans les jeunes fruits des Cèdres, de petites chenilles qui récoltées en vue de leur élevage m'ont presque toutes donné les *Apanteles* que vous avez reçus. Ces hyménoptères nymphosaient sur ou à l'intérieur du cône de cèdre miné par leur proie. La plupart des chenilles non parasitées sont mortes; elles ont, malgré mes précautions, subi l'hiver doux et humide du littoral atlantique au lieu du froid sec de la montagne marocaine. . . . Ifrane se trouve dans le Moyen Atlas à environ 60 km. au sud de Meknes, son altitude va de 1500 à 1700 m.; quelques sujets ont été obtenus d'une station voisine 'Tizi N'Tretten' 2000 m.”

Cocoons white.

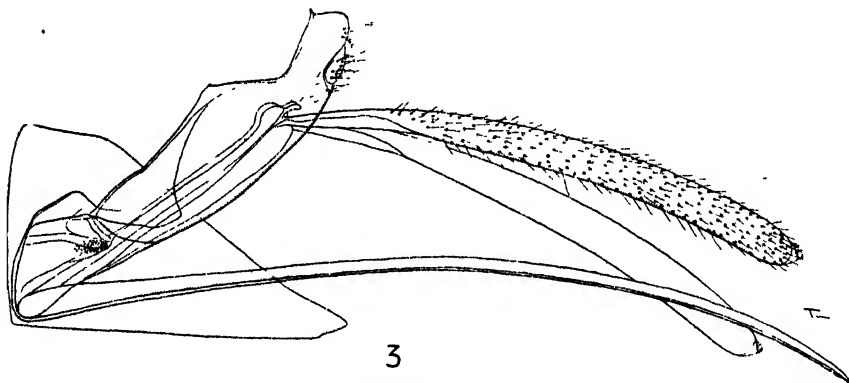


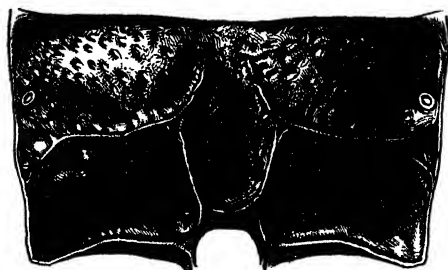
FIG. 3.—*Apanteles dioryctriae* sp. n., genitalia, ♀. × 40.

In Marshall's key (1888) this species runs to couplet 16 in Marshall's Section 2, but no further; and in Muesebeck's key (1920) of the nearctic species it would appear to run to *victoriae* Mues., with the description of which, however, it does not entirely agree. In my own key (1932, *Trans. ent. Soc. Lond.* 80, and as subsequently emended from time to time) it runs easily to couplet 119, which should be altered as follows :—

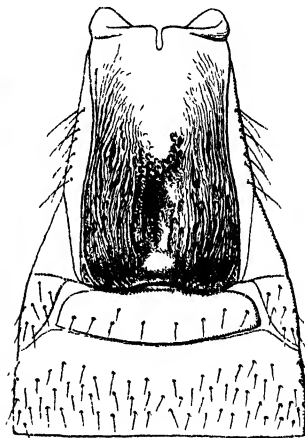
- | | | |
|-------|--|---------------------------|
| 119. | Tegulae testaceous; Tanganyika, Uganda | <i>sagax</i> Wilkn. |
| | Tegulae dark | 119a. |
| 119a. | Hind femora largely red testaceous; 3rd tergite with only a single, complete, transverse row of, and some few other, minute punctures; | |
| | India | <i>calyciniae</i> Wilkn. |
| | Hind femora black; 3rd tergite with extensive minute punctation; | |
| | Morocco | <i>dioryctriae</i> Wilkn. |

Apanteles coleophorae sp. n.

♀. Black; apical half of front femora (except sometimes above and below), front tibiae wholly, front tarsi (save for darkened feet and apical joint), middle femora at extreme apex, middle tibiae basally or in basal third or sometimes half, middle tarsi to a varying extent, hind trochantines below occasionally, hind tibiae basally or in the basal third, red testaceous; the middle tarsi vary between completely red testaceous (save for usual darkened apical joint and feet) and completely darkened; palpi pale; tibial spurs white; wings hyaline or faintly infumated, the setae coloured in apical three-fifths of all wings and apparently white in basal two-fifths; costal veins apically, stigma, metacarp, 1st abscissa of radial, transverse cubital, and 2nd abscissa of cubital, light red-brown, the costal veins basally red testaceous, and the remaining veins pale to colourless; stigma uniformly opaque.



4



5

FIGS. 4-5.—4. *Apanteles coleophorae* sp. n., propodeon; 5. *Apanteles coleophorae* sp. n., basal tergites, ♀. × 80.

♂. Black; front femora in apical third, front tibiae more or less throughout the inner margin, front tarsi to some extent (save for the black apical joint and feet), middle femora at apex, middle tibiae at base, middle tarsi to some extent (save for the black apical joint and feet), and hind tibiae at base, red testaceous; palpi pale; tibial spurs white; wings white hyaline, the setae white; metacarp, margins of the stigma, and certain portions of the costal veins, brown, the 1st abscissa of the radial, transverse cubital, and 2nd abscissa of cubital, weakly coloured, the remaining veins colourless; stigma otherwise hyaline.

♀♂. *Head*: face and clypeus closely punctate (degree 2); facial depressions nearer to apex of clypeus than to the eyes; frons and vertex minutely punctate; posterior ocelli about equidistant from each other and the eyes; flagellum of ♀ just longer than combined length of head, thorax, and abdomen, of ♂ longer than combined length of thorax and abdomen together with twice the length of the head, even approaching combined length of thorax and abdomen together with three times length of head. *Thorax*: mesonotum throughout regularly punctate (degree 3) and the lines of the notauli scarcely if at all indicated, narrowly across apex entirely smooth or with only exceedingly minute punctures (degree 1); disc of scutellum with only some few widely separated exceedingly minute punctures; the non-excavate area of lateral faces of scutellum reaching up only about half-way to base of

scutellum; propodeon figured (fig. 4). *Wings*: the 1st abscissa of the radial longer than, and but slightly angled with, the transverse cubital; metacarp longer than stigma. *Legs*: hind coxae basally above with a large group of separated, strong punctures (degrees 3 and 4), apically above and on outer faces throughout with regularly placed, widely separated, exceedingly minute punctures (degree 1); the hind tibial spurs subequal, the longer spur

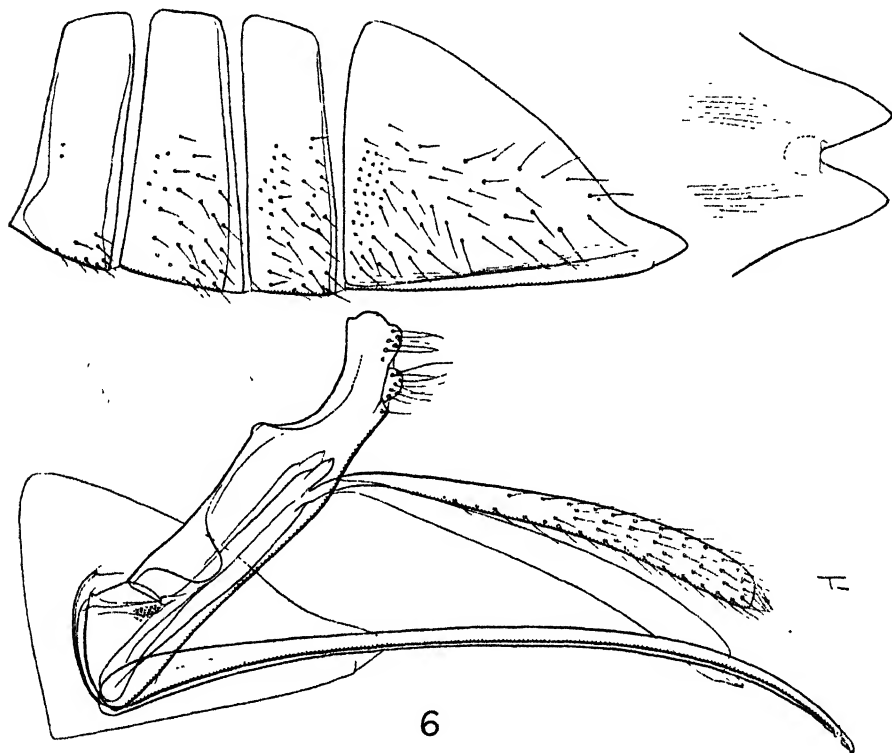


FIG. 6.—*Apanteles coleophorae* sp. n., apical ventrites and, below, genitalia, side view, ♀, $\times 80$; and apex of hypopygium, opened out, dorsal view, further much enlarged, to show apical slit.

half, or just less than half, the length of the basal segment of the hind tarsus. *Abdomen* (figs. 5–6): 1st tergite basally excavate and smooth save for striation along sides, medianly with a minutely rugose but not always strongly marked tumescence, apically turned over and rugose and striate and with some few strong punctures, but the sculpture often weak, a large median area noticeably depressed, the smooth median apical lunule never in evidence, in the ♂ the tergite narrower than in the ♀ and more usually much smoother and with the median tumescence often wanting; 2nd tergite with a row of minute punctures across centre and with not very well-marked sulci, otherwise smooth save often for some extremely indefinite sculpturing, in the ♂ the tergite narrower than in ♀; 3rd tergite entirely smooth broadly across base and narrowly across apex, otherwise minutely punctate; succeeding tergites minutely punctate; majority of ventrites of ♀ with median longitudinal suture; hypopygium more or less broadly membranous throughout the median line, and its apex membranously acute; ovipositor sheaths longer than combined length of the three basal segments of the hind tarsus but shorter than combined length of the four basal segments,

the ovipositor longer than the hind tarsus, rather shorter than combined length of hind tibia and the two basal segments of the hind tarsus.

Length, 2.0–2.7 mm.

Described from the following material:—G. SALT'S COLLECTION: 1 ♀, 5 ♂♂, vi.1936 (*J. L.*), England, 19 ♀♀, 8 ♂♂, 1936 (*Miss J. Laing*). D. S. WILKINSON'S COLLECTION: Balcombe, Sussex, England, 1 ♀, 1 ♂, 22.vi.1937 (*H. M. Edelsten*); Cambridge, England, 21 ♀♀ (one the *type*), 26 ♂♂, coll. 8.vi.1937, em. 6.vii.1937 (*R. L. E. Ford*); Bexley, Kent, England, 3 ♀♀, 7 ♂♂, coll. 2.v.1937, em. 8.viii.1937 (*R. L. E. Ford*); Ullswater, Cumberland, England, 4 ♀♀, 2 ♂♂, coll. 15.vi.1937, em. 4.vii.1937 (*D. S. Wilkinson*).

Type deposited in the British Museum.

Host. All the material from which I have described this species was bred from the Tineid, *Coleophora fuscidinella* Zell., either on elm, as in the case of the specimens from Cambridge, which includes all Dr. Salt's material, and from Bexley, or on alder.

Cocoons. The parasite pupates inside the case of its host.

This interesting species runs in Marshall's key (1888) to couplet 16 in the second section, and thence, by couplet 18, to couplet 29; but it will not agree with Marshall's description either of *sodalis* Hal., or, alternatively, in the succeeding couplet, of *albipennis* and *impurus* of Nees. As far as the American species are concerned, *coleophorae* will agree with none of the many that are represented in the British Museum; and in Muesebeck's key (1920) it runs to couplet 48, but it is not referable to *lacticolor* and its costulae are strongly in evidence. In my own key (1932, *Trans. ent. Soc. Lond.* **80**, and as subsequently emended) this new species of mine runs easily to couplet 181 and 184, which should be altered as follows:—

- | | | |
|-------|---|-----------------------------|
| 181. | Second tergite rugose | 182. |
| | Second tergite not rugose | 183. |
| 184. | Female with apical breadth of 1st tergite hardly greater than median length of 2nd (12:11); S. Africa | <i>*transvaalensis</i> Cam. |
| | Female with apical breadth of 1st tergite considerably greater than median length of 2nd | 184a. |
| 184a. | Hypopygium more or less broadly membranous throughout median line, and its apex membranously acute; British Isles <i>coleophorae</i> Wilkn. | |
| | Hypopygium not membranous along median line, its apex acute but not membranously so; Africa | <i>aethropicus</i> Wilkn. |

ON THE BRITISH LESTREMIINAE, WITH NOTES ON EXOTIC SPECIES.—6. (DIPTERA, CECIDOMYIIDAE)

By F. W. EDWARDS, M.A., Sc.D., F.R.E.S.

Aprionus Kieffer (figs. 17–18).

IN introducing this genus Kieffer described four species of which he had obtained material of both sexes by rearing, one of these (*spiniger*) being indicated as the genotype. I have taken only two males which I refer with doubt to *spiniger*, but another of Kieffer's species (*digitatus*), which is recognisable with certainty on account of the peculiar form of the male style, proves to be common in

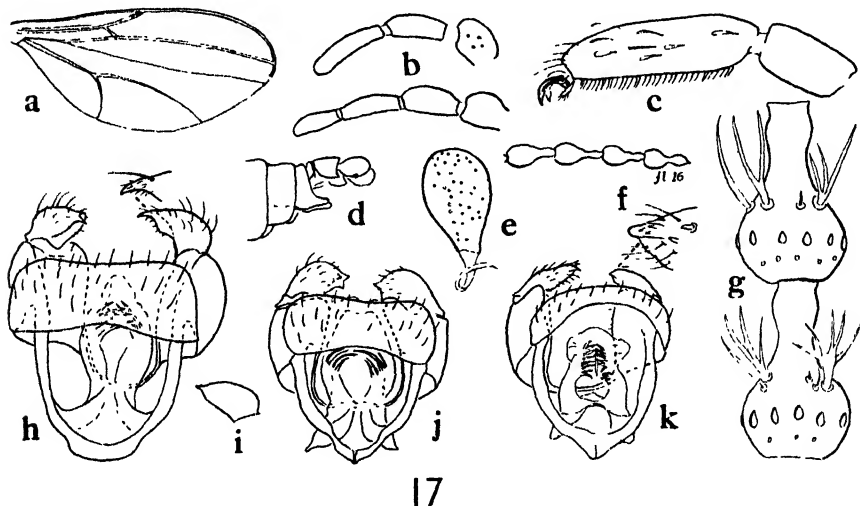


FIG. 17.—a–i, *Aprionus flaviventris* (Winn.); j, *A. bidentatus* Kieff. (?); k, *A. spiniger* Kieff. (?). a, ♂ wing; b, palpus (two types); c, last two segments of ♀ front tarsus; d, tip of ♀ abdomen; e, spermatheca (standard scale); f, g, outline of tip of ♀ antenna, with two segments enlarged; h, j, k, hypopygia (British ♂♂); i, variation in ♂ style (Winertz's type of *albicauda*).

Britain and pending the precise identification of *spiniger* I base my interpretation of the genus on *digitatus*.* The following diagnosis is based on a comparison of about eight British species:—

Eyes undivided, bridges 2–4 (usually 3) facets wide. Front somewhat bilobed. Palpi with either 3 or 4 segments. Antennae of ♂ with 1–3 complete crenulate whorls on each of the 12 flagellar segments. Antennae of ♀ with 11–20 more or less flask-shaped segments in flagellum; sensoria rather variable in form, typically blade-like, sometimes more or less deeply bifid or trifid, usually 4 in number (sometimes 6–8 but never 2), each arising from

* Dr. Felt informs me that there is a pair of *A. spiniger* in his collection, now in the New York State Museum. Up to the time of going to press I have been unable to obtain confirmation of this.

one large pore. Mesonotum rather densely clothed with short hair. Tarsi with small scales; empodium short or rudimentary; claws either simple or with a few fine teeth. Wings: *R*1 under three times as long as *Rs*, usually much less; costa produced, but not reaching tip of *M*; *Cu*2 somewhat curved and reaching margin; macrotrichia as in *Bryomyia*—dense on membrane and most veins, but very few or none on *R*5; pore 5 on *rm*. Hypopygium: tergite large, more or less rectangular; cerci hardly developed; coxites almost separate, united ventrally by a very narrow ribbon-like loop; style various in form, usually with spine-like beak (but not an articulated spine); roots of coxites forming a long internal loop extending well beyond the sternal loop; genital rod absent (except in *spiniger*?, when it is rudimentary) but aedeagus with from 1 to 8 ventral spines on each side. Spermathecae always single, spherical or pear-shaped, not very large, duct wide but not sclerotised at origin.

The most striking feature of the genus is the structure of the hypopygium, which is unlike that of any other genus of the subfamily. All the species are found about old logs and stumps; often several species may occur around the same stump at the same time, so that correct association of the sexes is difficult.

A. flaviventris (Winn.) (fig. 17, a-i).

(*C. albicauda* Winn.).

A rather large species, the largest of the genus known to me. Blackish, with the membranous parts reddish; legs and hypopygium more or less pale. Mesonotum dull, with dark hair, the hair at sides and on dorso-central stripes conspicuously longer than the rest. Scutellum with 6-12 strong marginal hairs in addition to dorsal pubescence. Palpi with either 3 or 4 segments; when only 3 are present the terminal segment may be long or only moderately long (the variation occurs among specimens of the same sex taken at the same place and time and otherwise identical). Eye-bridges about four facets broad. Scales on tarsi narrow; claws with several fine teeth before the slight subapical swelling; empodium better developed than other species of the genus, fleshy part nearly half as long as claws, one or two hairs almost reaching tips of claws. Venation: *R*1 somewhat longer than in the other species, about 2.5 times *Rs*.

♂. Flagellar segments mostly with two complete crenulate whorls (the first few segments may have only one and the last few may have three) in addition to one or two incomplete ones; necks of middle segments almost as long as the basal part, of penultimate segment more than half as long, terminal segment long and pointed. Hypopygium very long, owing to the great development of the loop formed by the united roots of the coxites, which is longer than in any other species; style with a finely pubescent spine-like beak (variable in length) and a projecting flange on inner side (in some positions giving the appearance of a second beak); aedeagus normally with four slender spines on each side, but occasionally with only three or even two. Wing-length about 2.5 mm.

♀. Flagellum with 16-20 segments, the terminal one usually double, necks long; sensoria in the form of slender curved spines which may be either simple or split into 2-5 branches. Fifth segment of all tarsi darkened; of front tarsus twice as long as fourth and with rather dense pubescence on the sole. Spermatheca rather large, pear-shaped, with numerous pores. Wing-length 3-3.5 mm.

HERTS.: Offley, Welwyn; BUCKS.: Ivinghoe; BEDS.: Whipsnade; HANTS.: New Forest; OXON.: Oxford; GLOS.: Symond's Yat; CHESHIRE: Arden Hall; SURREY: New Malden; KENT: Wye; SUSSEX: Crowborough. Specimens mostly taken about old beech logs; iv., ix.

This species was recorded by Barnes (1927) as *A. miki* Kieff., but I do not think that identification can be correct, owing to several discrepancies, notably

the presence in this species of a distinct empodium. Owing to a misprint in Barnes' description the number of flagellar segments in the ♀ was given as 12; actually in his specimen there are 16.

A. bidentatus Kieff. (?) (fig. 17, j).

♂. Middle flagellar segments with necks only half as long as nodes (tip of antenna missing in the single specimen examined). Palpi 4-segmented. Empodium rudimentary; claws with only two minute teeth. Vein *R*1 barely twice *Rs*. Hypopygium much resembling *flaviventris*, but interior loop not so long and style with two points. Wing-length only 1.7 mm.

N. DEVON : Clovelly, v.1936, 1 ♂ by old beech trees.

I refer this with much doubt to *A. bidentatus*; Kieffer's specimen seems to have been larger and was possibly *A. flaviventris*.

A. spiniger Kieff. (?) (fig. 17, k).

♂. Flagellar segments mostly with two complete crenulate whorls, but several segments at base with only one; necks at most half as long as nodes, on penultimate segment not one-third as long; terminal segment not much longer than broad. Palpi 4-segmented. Empodium rudimentary; claws without obvious denticles. Vein *R*1 barely 1.5 times *Rs*. Hypopygium: differs from that of all other species of the genus known to me in the narrower tergite, in the minutely spinulose tip of the style (the spinules only visible under a very high magnification, e.g. 1₁" dry objective), and the presence of eight spines on each side of the aedeagus; between the two sets of aedeagal spines a rudimentary genital rod is visible. Wing-length only 1.4 mm.

N. DEVON : Clovelly, v.1936, 1 ♂; HANTS.: New Forest, 17.x.37, 1 ♂. Both taken about old beech trees.

In describing *A. spiniger* Kieffer states that the tip of the male style terminates in about eight spinules, which at a low magnification appear to form a single tooth. As the above-described species is the only one I have found in Britain which exhibits a comparable structure I provisionally regard it as *A. spiniger*, although the tip of the style is not so markedly spinulose as shown in Kieffer's figure and the size is smaller (length of body under 2 mm.; Kieffer says 2.4 mm.).

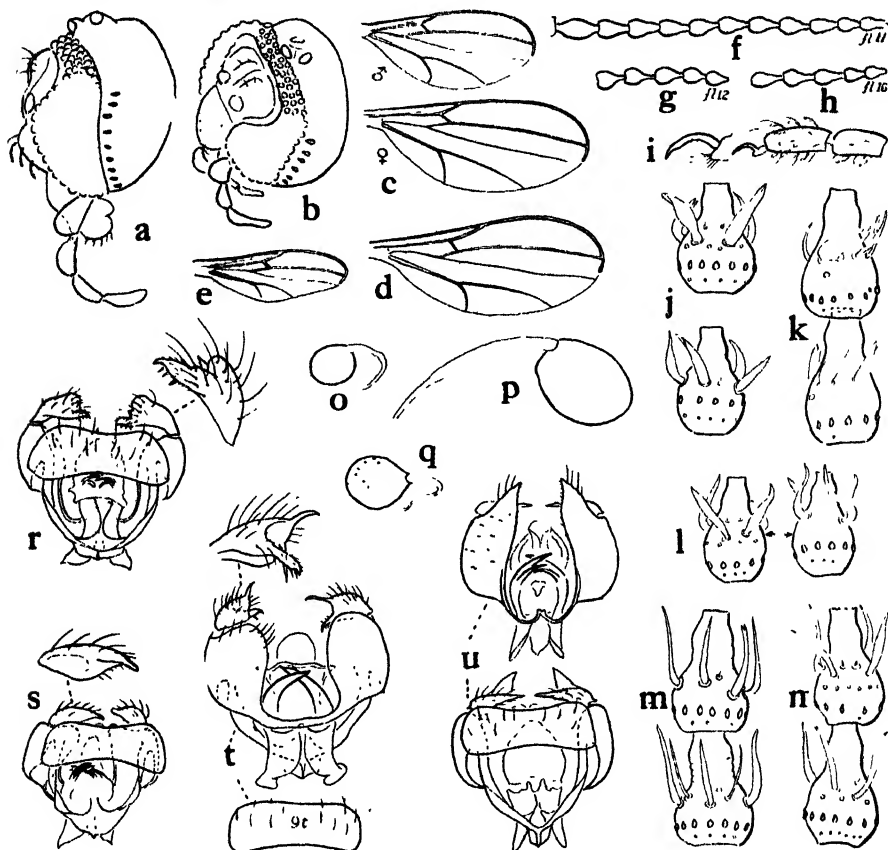
A female specimen lent me from the Berlin Museum and labelled "*Aprionus spinigera* Kieffer, Bitsch, 1894," is indistinguishable from the female of *A. flavidus* and is therefore perhaps wrongly determined; unfortunately the male from which Rübsaamen prepared the figure published by Kieffer does not seem to have been preserved in his collection.

A. flavidus (Winn.) (fig. 18, c, g, j, o, r).

(*A. digitatus* Kieff.).

A small species, mainly blackish but with membranous parts (much of pleura and abdomen) light reddish. Mesonotum slightly shining, hair dark, not so dense as in *flaviventris*, dorso-central hairs not noticeably longer than the rest. Scutellum with 6 or more strong marginal hairs and some short dorsal pubescence. Eye-bridges three facets broad. Palpi as in *flaviventris* with either three or four segments with about equal frequency. Scales on tarsi broader than in *flaviventris* and therefore appearing denser; claws with one or two minute denticles sometimes visible before the slight apical swelling; empodium rudimentary, with a few usually short hairs. Wings narrower than in *flaviventris*; *R*1 under twice as long as *Rs*.

♂. Flagellar segments mostly with only one crenulate whorl, last few with two; necks of intermediate segments over two-thirds, on penultimate segment about half as long as basal portion. Hypopygium distinctive owing to the thumb-like projection on the broad style; two small spines on each side of aedeagus. Wing-length about 1.5 mm.



18

FIG. 18.—*Aprionus* spp., small species. a, b, head showing form of eyes, etc.: a, *flavidus* (?), ♀; b, *miki* (?). c-e, wings: c, *flavidus*, ♂ (British) and ♀ (Winnert's type); d, *lepidus* (type ♀); e, *brachypterus*. f-h, j-n, outline of ♀ antenna with one or two segments enlarged: f, l, *miki* (?); g, j, *flavidus*; h, m, *acutus*; k, *flavidus*, var. ?; n, *brachypterus*. i, tip of front tarsus with claw more enlarged. o-q, spermatheca: o, *flavidus*; p, *acutus*; q, *miki* (?). r-u, hypopygia: r, *flavidus*; s, *miki* (?); t, *bispinosus*; u, *acutus*.

♀. Flagellum with 12 top-shaped segments, last two sometimes incompletely separated; sensoria broad, just reaching base of succeeding segment, some of them more or less bifid at tip; last segment small, without sensoria. Fifth segment of front tarsus not much longer than fourth, without dense pubescence beneath. Spermatheca roundish. Wing-length nearly 2 mm.

HERTS.: Hitch Wood, Offley, Welwyn; BUCKS.: Ivinghoe; HANTS.:

New Forest; N. DEVON: Clovelly. In all cases about old beech trees, but must occur on other rotting logs (Kieffer recorded the species from sallow).

A female taken in Sherrard's Wood, Welwyn, 22.x.36, possibly belongs to another allied species. It has 14 flagellar segments which are longer than those of *A. flavidus* and with relatively shorter (though similar) sensoria (fig. 18, k). The longer hairs of the empodium reach nearly to the tips of the claws (fig. 18, i). Head as in fig. 18, a.

***A. bispinosus* sp. n.** (fig. 18, t).

♂. Very similar to *flavidus*. Necks of flagellar segments slightly shorter; claws perhaps more slender and quite smooth; empodium rudimentary, with short hairs only. Palpi 4-segmented in all four specimens examined. Hypopygium: style of distinctive shape, with pubescent thumb-like process as in *flavidus* and also with two long divergent bare spines; aedeagus of unique form in having a single very stout spine on each side; interior loop not very long. Wing-length about 1.3 mm.

♀. Unrecognised, unless the above-mentioned specimen with 14-segmented flagellum belongs here.

HERTS.: Hitch Wood, 26.ix.37, 2 ♂♂ (incl. type); Welwyn, 23.ix.37, 1 ♂;
BUCKS.: Ivinghoe, 3.x.37, 1 ♂.

***A. acutus* sp. n.** (fig. 18, h, m, p, u).

Very similar to the last two. Palpi longer than in *flavidus*; 4-segmented in all specimens examined (15 ♂♂, 10 ♀♀). Empodium rudimentary, with short hairs; tarsal scales rather broad. Venation: *R*₁ in both sexes rather longer than in *flavidus*, about 2.5 times *Rs*.

♂. Flagellar segments rather more slender than in *flavidus*, mostly with two complete crenulate whorls, terminal segment with three. Hypopygium: style small, simple, not very wide even at base and tapering to a sharp point; each coxite produced ventrally into a sharp triangular point; aedeagus with two rather strong spines on each side. Wing-length about 1.7 mm.

♀. Flagellum with 14–16 flask-shaped segments; necks rather long except on penultimate segment, which has no distinct neck; last segment rather small, narrowed distally. Sensoria longer and narrower than in *flavidus*, almost all simple, a few very slightly bifid at tip; the hairs which as usual alternate with the four main sensoria tend to be longer than in most of the other species and some of them are thickened, forming accessory sensoria. Tarsi as in *flavidus*. Spermatheca large, ovate; duct remaining broad for a longer distance than in other species. Wing-length 2.2–2.5 mm., body about 2.5 mm.

HERTS.: Hitch Wood, near King's Walden, series including type ♂, and Sherrard's Wood, Welwyn; taken about old decaying beech logs, ix.–x.36 and ix.37.

***A. lepidus* (Winn.).**

According to my notes on the type this species has the empodium nearly as long as the small claws, but the antennae (♀) are formed very much as in *A. acutus*, the sensoria being quite similar but the number of segments fewer—there are 11 flagellar segments, the tenth without neck and incompletely separated from the eleventh, which is constricted in the middle. The wing (fig. 18, d) is quite similar to that of *A. acutus*. The presence of an empodium seems to preclude the identification of *A. lepidus* with *A. acutus*, apart from the shorter antennae; however, the two seem clearly to belong to the same group of *Aprionus*.

A. miki Kieff. (?) (fig. 18, b, q, s).

A small species resembling *flavidus*. Eye-bridges 2-3 facets broad. Scutellum with 4-6 strong marginal hairs. Palpi with either three or four segments (three in 7 out of 11 specimens examined); when 3-segmented the third segment longer than the second. Scales on tarsi distinct but not quite so broad as in *flavidus*; claws without definite denticles; empodium rudimentary, with a few very short hairs. Wings with *R*₁ 1.5-1.7 times as long as *Rs*.

♂. Flagellar segments mostly with only one complete crenulate whorl, except last few segments, which may have two; necks mostly three-quarters as long as basal parts of segments, on penultimate segment half as long. Hypopygium small; style broader than in *acutus*, but rather flattened and so varying in apparent shape according to angle of view, with a short, bare, terminal spine-like beak; coxites with a rounded ventral apical projection (much less prominent than the sharp projection of *acutus*); aedeagus with two spines on each side. Wing-length 1.3 mm.

♀. Flagellum with 11 segments shaped much as in *flavidus*; penultimate more oval, without neck, terminal with its distal half smaller. Sensoria much as in *flavidus* but all simple and two of them on each segment strongly curved. Tarsi and spermatheca as in *flavidus*. Wing-length 1.5-1.7 mm.; body 1.7-2 mm.

HERTS.: Hitch Wood, 2 ♂♂; Welwyn, 1 ♀; BUCKS.: Ivinghoe, 4 ♂♂; HANTS.: New Forest, 1 ♂, 2 ♀♀; S. DEVON: Sidmouth, 1 ♂. Taken about old beech logs in company with other members of the genus, v., ix.-x.

The three females obtained are rather doubtfully associated with the males. As this is the only species I have seen which answers fairly closely to Kieffer's description of *A. miki* I adopt this name for it. Kieffer did not mention the number of segments in the female antenna.

A. brachypterus sp. n. (fig. 18, e, n).

♀. Eye-bridges two facets wide. Antennal flagellum 11-segmented, most segments flask-shaped, the distal part narrowed and almost as long as the basal part, forming a long but ill-defined neck, this shorter but distinct on penultimate segment; sensoria slender, simple, four in number and not very strongly curved; terminal segment without sensoria, constricted in middle, the distal half smaller. Palpi 3-segmented and shorter than in the other species; first segment not much enlarged but with a sensory patch above. Thorax unusually small, brownish and somewhat shining, more scantily haired than in the other species, some long dark bristly hairs at sides of mesonotum and smaller hairs in dorso-central stripes; scutellum with only two marginal hairs (the type is in perfect condition and evidently no scutellar hairs are missing). Abdomen mainly pale (yellowish in the dry specimen), tergites very little darkened, cerci normal. Legs pale; tarsi without obvious scales (possibly rubbed off in mounting); empodium rudimentary or absent; fifth segment of front tarsus about half as long again as fourth, which is less than twice as long as broad, second and third segments also shorter than fifth. Wings noticeably shorter than abdomen and quite narrow, probably useless for flight (the condition appears normal as both wings are alike and not at all crumpled); *R*₁ about twice *Rs*. Wing-length 1.0 mm.; body (excluding head, with abdomen not quite fully extended) 1.7 mm.

CHESHIRE: Longdendale, 24.iv.1932, 1 ♀ (*H. Britten*). Type in British Museum.

Although I have only one specimen, it seems well distinguished, not only on account of the abbreviated wings but of the reduction of the scutellar hairs. Rübsaamen's *Campylomyza dimorphogyna* was described as having the wings abbreviated or absent in the female sex, but cannot be identified with our

species as it has only eight flagellar segments; though listed by Kieffer with *Aprionus* it is perhaps more likely to be a *Monardia* or *Pezomyia*.

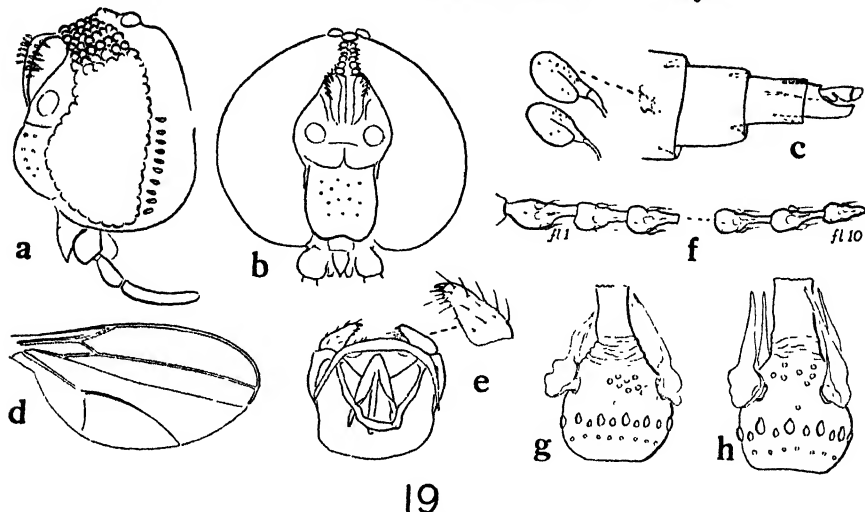


FIG. 19.—*Trichopteromyia modesta* Will. a, side view of head showing broad eye-bridges (British specimen); b, front view of head (Williston's type); c, tip of abdomen, with spermathecae more enlarged; d, wing of ♂; e, hypopygium; f, outline of ♀ antenna; g, one segment of antenna, Kieffer's type of *Pr. latipennis*; h, ditto, British ♀.

Trichopteromyia Williston (fig. 19).

(*Projoannisia* Kieffer.)

Trichopteromyia modesta Williston, 1896, was described from a single female specimen from St. Vincent, W.I.; *Projoannisia latipennis* Kieffer, 1912, from a single female from the Seychelles Is. The two types are in the British Museum, and except that *T. modesta* has lost its antennae are in fair condition. I have carefully compared them and can find no differences between them; moreover, I have examined a whole series of British specimens which appear to belong to the same species. From this study the following amended diagnosis of the genus may be given:—

Eyes undivided, bridges very broad, about 6 facets wide. Front with a pair of prominent lobes. Palpi 3-segmented, third segment long. Antennae of ♂ with 2 + 12 segments, those of flagellum eccentric, with long necks, and with a single complete crenulate whorl obliquely placed in middle, two rather irregular whorls of simple setae before middle and two or three incomplete crenulate whorls on ventral side beyond middle. Antennae of ♀ with 2 + 10 segments, those of flagellum with long necks and provided with four or five sensoria each arising from one large pore. Mesonotum densely clothed with close-lying scaly pubescence. Wings broad, macrotrichia dense on membrane and all veins (including *R*5); costa produced; *R*1 barely twice *R*s, which is long and oblique; *M* obsolete distally but distinct at base; *Cu*2 slightly curved, reaching margin; pore 5 on *rm*. Hypopygium small, structure much as in *Monardia* and *Xylopriona*: tergite narrow, coxites largely fused, style with terminal tooth, tegmen shield-shaped, genital rod present. Spermathecae two in number, somewhat retort-shaped and rather small, ovipositor not markedly extensile, cerci unusually small.

The genus is evidently very close to *Monardia* in the sense here understood, differing most obviously in the very broad eye-bridges.

T. modesta Will.

(*C. latipennis* Kieff.)

Colour largely reddish in life, mesonotum and sternopleura dark brown; legs pale. Legs, especially tarsi, densely clothed with small broadish scales; similar scales also present on frontal lobes, palpi and first two or three segments of antennae; pubescence of thorax and abdomen also rather scale-like. Last front tarsal segment of ♀ not swollen but a little longer than fourth. Necks of flagellar segments of ♂ mainly pale (in most other species they are dark). Wing-length 1.8–3 mm.

HERTS.: Sherrard's Wood, Welwyn, taken over pile of oak logs; Hitch Wood, by old beech logs; YORKS.: Goathland; CROMARTY: Dingwall.

As noted above, I am unable to distinguish between British females and the types from St. Vincent and the Seychelles Is. The male is described here for the first time.

Monardia Kieffer (figs. 20–22).

This genus was proposed by Kieffer for a single species (*M. stirpium* Kieff.) which according to him was specially characterised by having a single minute subapical tooth on the claws, rudimentary empodium, four mushroom-shaped sensoria on each of the ten flagellar segments of the female (including the last), a greatly lengthened fifth segment of the front tarsi in the female, and vein *R*₁ quite short. The claw character, as pointed out by Felt, seems to be of little importance; the female antennal sensoria are doubtless more significant, but there is so much variation between species of this group that it is difficult to decide on the limits of the genus. For the present I propose to refer to *Monardia* all Campylomyzini which have the following characters in common:—

Eyes undivided, though the bridges may be very narrow (2 facets wide). Palpi with 3 or 4 segments, in the former case the second and third together much longer than the first. Antennal flagellum of ♂ with 12 segments which have one or more crenulate whorls; flagellar segments of ♀ normally with four (sometimes five) sensoria, each arising from a single large pore and usually more or less mushroom-shaped. Tarsi with numerous scales (sometimes very narrow). Empodium either absent or quite narrow. Wings: costa produced; *Cu*₂ reaching margin; *R*₅ with macrotrichia; pore 5 on *rm*. Hypopygium: tergite moderate or narrow; cerci inconspicuous; coxites extensively united at base beneath; style usually with terminal spine; tegmen shield-shaped; genital rod present. Spermathecae usually two, with narrow ducts.

All the species now placed here are certainly not nearly related, in fact it is easy to recognise several distinct groups, some of which might well be placed in different subgenera or genera; I refrain from proposing names for any of these groups because it is simpler to refer all to *Monardia*; because some of Kieffer's genera founded on larvae only may eventually be proved to apply to them; and because I have not seen the genotype (*stirpium*), which seems in several respects quite different from any of those hitherto found in Britain or America.

I have not observed variation in the number of palpal segments in any species of this genus; this is in contrast with *Aprionus*, where such variation is common.

The following key will indicate the chief characters used for grouping the females (the males, where known, are less readily grouped):—

1. Sensoria in the form of broad plates arising from several small pores; empodium rudimentary; claws thick in middle *antennata*.
Sensoria in the form of "stemmed discs" (four or five in number), each arising from a single pore 2.
2. Empodium absent or rudimentary 2.
Empodium almost or quite as long as claws 7.
3. Fifth front tarsal segment four times the fourth; flagellum 10-segmented
Fifth front tarsal segment at most twice the fourth; flagellum at least 15-segmented 4.
4. *M* and *Cul* distinct; *R*₁ longer; first segment of palpi covered with scaly sensoria 5.
M and *Cul* faint; *R*₁ very short; first segment of palpi without obvious sensoria *obsoleta*.
5. Abdomen elongate; *R*₁ four times *Rs*; mesonotum partly bare *magna*.
Abdomen plump and shortish; *R*₁ at most three times *Rs*; mesonotum uniformly pubescent 6.
6. Palpi 4-segmented; *R*₁ about three times *Rs* *monilicornis*, *kollari*.
Palpi 3-segmented; *R*₁ under twice *Rs* *ulmaria*.
7. One spermatheca *monotheca*.
Two spermathecae *nigricans*.

M. antennata (Winn.) (fig. 20).

A moderately large species, mainly reddish in colour (at least when freshly emerged), with mesonotum and sternopleura blackish. Eye-bridges 3-4 facets wide. Palpi 4-segmented, first segment not very large. Mesonotum with dense close-lying pubescence. Legs densely clothed with small scales, which are broad on tarsi, narrow (and less dense) on coxae. Claws with a marked swelling on inner side near middle, and with one or two minute denticles; empodium rudimentary. Wings broad, venation much as in *Xylopriona*; *R*₁ twice to three times *Rs*, latter very oblique; costa produced but not as far as tip of *M*; *Cu*₂ curved, continuing faintly to margin. Macrotrichia numerous on *R*₅ as well as on other veins and dense on membrane.

♂. Flagellar segments with long necks and mostly with two complete crenulate whorls, the median one the denser. Hypopygium very small for the size of the insect; tergite moderately broad; coxites not extensively fused; style short, oval, without trace of terminal spine. Wing-length 2 mm.

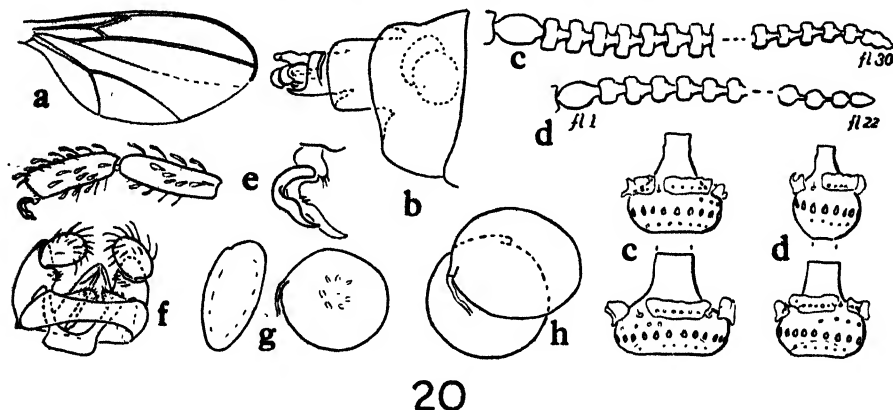
♀. Flagellar segments 22-35 in number, mostly with the basal portions broader than long (breadth relatively greater in specimens with more numerous segments); sensoria in the form of three or four broad plates, each arising from several small pores (thus resembling *Xylopriona* and differing from all other species of *Monardia*). Abdomen plump, ovipositor not extensile, cerci very short, deeper than long. Spermathecae two in number, both large and disc-shaped, dark, without obvious pores. Wing-length 2.2-3 mm.

HERTS.: Hitch Wood and Welwyn; BUCKS.: Ivinghoe. ix.-x.

The variation in number of flagellar segments in the female is remarkable; it seems to be largely correlated with size, small specimens having fewer and less lenticular segments. It is possible, however, that two distinct forms may be present; this possibility is increased by the fact that in the smallest specimen mounted (fig. 20, d and g) the sclerotised part of the duct of the spermatheca is longer and thinner than in other examples. Winnertz's type female has 23 segments in the flagellum, resembling in shape those of this small specimen.

M. magna sp. n. (fig. 21, c, g, h, l, q).

♀. Head dull black above, as usual; face and palpi brownish. Eye-bridges 5 facets broad at vertex, 3-4 at origin, but the facets in the whole eye relatively smaller and more numerous than in many species. Antennae long, with 2 + 30 segments, those of flagellum each with four large flower-like sensoria each arising from a single large pore; necks at first rather short and stout, gradually becoming longer and thinner, those towards tip of antenna rather longer than basal part. Palpi long, 4-segmented, fourth as long as two preceding together; first with upper surface largely clothed with small sensoria. Thorax blackish,



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FIG. 20.—*Monardia* (?) *antennata* (Winn.). a, wing of ♂; b, tip of ♀ abdomen; c, d, outline of antennae of ♀ with two segments enlarged; e, palpus; f, hypopygium; g, h, spermathecae; d, g, typical ♀; c, h, var. (?) with more numerous antennal segments.

mesonotum slightly shining, hair chiefly in dorso-central stripes, some rather sparse short hair between these stripes in front but extensive bare areas on each side of them (not due to rubbing). Abdomen long and tapering, tergites 2-8 all well developed, longer than broad; spermathecae two, nearly globular. Legs mainly dark, but first segment of front and middle tarsi paler except at tip; fourth segment of front tarsi about 2.5 times as long as broad, fifth about 1.3 times fourth; tarsal scales small and inconspicuous; empodium rudimentary; claws long, moderately curved, without obvious thickening. Wings blackish owing to rather dense macrotrichia (also on R5); R1 nearly four times R5; cubital fork unusually long, Cu1 over twice as long as stem. Halteres scarcely darkened. Length of body (excluding antennae) 5.5 mm., wing 5 mm.

HERTS.: Sherrard's Wood, Welwyn, 22.x.36, 1 ♀ over old fallen cherry tree.

This specimen is the largest of the tribe known to me; although evidently allied to the next three it seems quite distinct by vestiture of thorax, venation, etc.

M. ulmaria sp. n. (fig. 21, a, d, i, m, p).

Eye-bridges three facets wide at vertex, two at origin. Palpi 3-segmented, first with dense sensoria as in *M. magna*. Mesonotum dull, fairly uniformly though not very densely clothed with short decumbent hair. Tarsal scales very narrow; empodium absent; claws simple. Wings narrower than in *magna*; R1 only 1.5-1.7 times R5; macrotrichia not so dense, few on R5; Cu2 nearly straight; *M* distinct throughout.

♂. Flagellar segments with one basal hair-whorl and with only one crenulate whorl, and

even on this some of the hair-bases on the upper surface are disconnected; necks mostly rather longer than basal parts of segments; first few segments with two sensoria similar to those of ♀, but smaller. Hypopygium of the usual *Monardia* type; tergite rather broad; style with terminal tooth. Wing-length 2 mm.

♀. Flagellum with 16 segments formed much as in *magna*, mostly with necks almost as long as basal part; terminal segment without sensoria but constricted beyond middle. Fourth segment of front tarsus barely 1.5 times as long as broad, fifth nearly twice fourth. Spermathecae two, collapsed in the single specimen examined, but apparently nearly round. Cerci roundish. Wing-length 2.5 mm.

BUCKS.: Chesham, 9.v.1898, bred from rotten elm stump (*E. G. Elliman*), 3 ♂♂, 1 ♀. Type ♀ in British Museum.

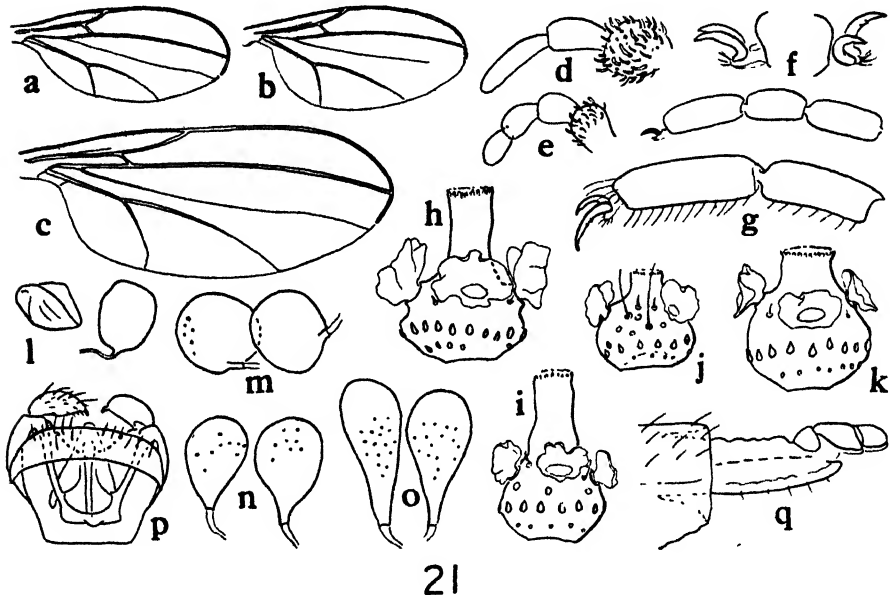


FIG. 21.—*Monardia*, larger species. a, d, i, m, p, *ulmaria*; b, e, f, j, o, *kollari*, cotype ♀; k, n, *monilicornis* (Scottish ♀); c, g, h, l, q, *magna*. a-e, Wings; d, e, palps; f, g, tip of ♀ front tarsus; h-k, enlarged single segments of ♀ antenna (same scale); l-o, spermathecae (same scale); p, hypopygium; q, tip of ♀ abdomen.

M. monilicornis (Zett.) (fig. 21, k, n).

Eye-bridges 4-5 small facets wide. Front slightly bilobed. Palpi 4-segmented, clothed with scales, first with patch of sensoria above, second, third and fourth subequal in length. Mesonotum dull, with fairly dense short decumbent hair. Tarsal scales fairly broad on last few segments; empodium absent; claws with slight enlargement in middle. Wings rather broad, with dense macrotrichia; *R*₁ about three times *R*_s; *M* distinct but not quite reaching margin; *Cu*₂ rather bent down at tip.

♂. Not identified.

♀. Flagellum with 17 to 20 segments, the terminal one with constriction near middle and with smaller distal portion; necks of first few segments quite short, and even those of the distal segments hardly more than half as long as the basal portion; four flower-like sensoria

as in *magna* and *ulmaria*. Fifth segment of front tarsi barely 1.5 times as long as fourth and not any stouter. Abdomen rather short and plump, tergites broader than long, ovipositor not extensile; spermathecae pear-shaped, with few pores. Wing-length 3-4 mm.

CAMBS.: Cambridge (*Jenkinson*); OXON.: Oxford (*Hamm*); BANFF: Falls of Tarnash (*Coe*); ABERDEEN: Ballater (*King*); INVERNESS: Nethy Bridge (*King*).

From information supplied me by Dr. Kemner regarding Zetterstedt's type, I think this identification must be correct. I have seen a long series of females of this species from the collection of the German Entomological Institute, taken in the neighbourhood of Berlin.

M. kollari (Winn.) (fig. 21, b, e, f, j, o).

Winnertz described this species from two females in the Vienna Museum, which I have examined; one of them is illustrated here. The specimens show most of the characters of *M. monilicornis* as described above, but have the spermathecae much more elongate, a wing-length of only 2.1 mm., and the eye-bridges only two facets wide at origin (the narrowest point). They probably represent a distinct species allied to *M. monilicornis*.

Judging from his description and figures, Felt's *M. lignivora* must be very similar to *M. kollari*, if it is not the same species.

M. obsoleta sp. n. (fig. 22, e, f, n, o, r).

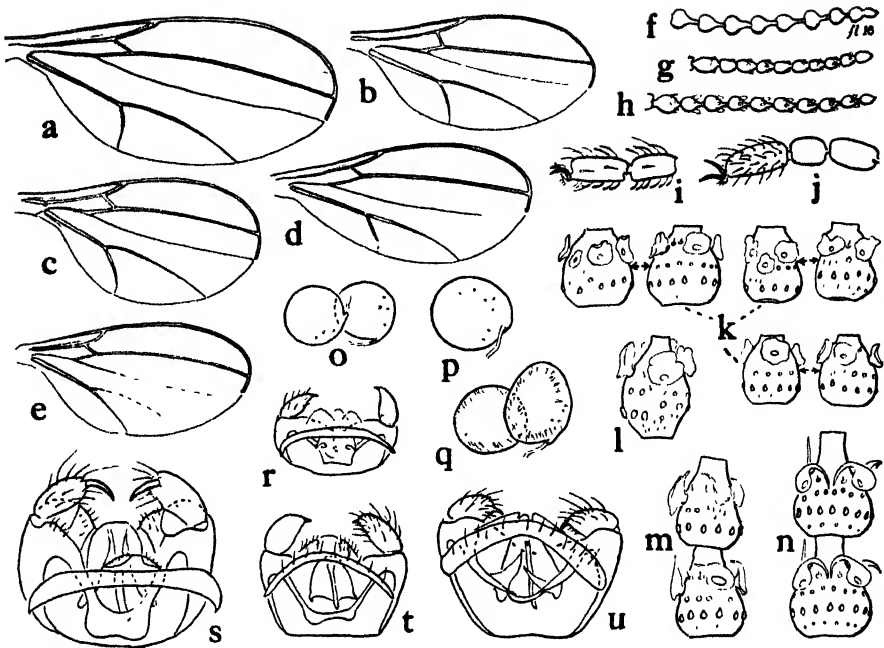
A small species with venation resembling that of *Mycophila*, veins *M* and *Cu1* being very faintly indicated except at base. Eye-bridges two facets wide at origin, three at vertex. Palpi 3-segmented, first not very large and without obvious sensoria, third over twice as long as second (perhaps sometimes divided into two, though this is not the case in any of the eight specimens examined), all three with numerous scales similar to those of the tarsi. Mesonotal hair scanty, almost confined to sides and dorso-central stripes, not very short. Tarsi with rather dense and rather broad scales; empodium rudimentary; claws almost smooth. Wings with macrotrichia fairly dense, including a row on *R5*.

♂. Flagellum with 12 segments as usual in this genus, ornamentation similar to the other small species; no obvious sensoria; basal enlargements hardly longer than broad, necks mostly distinctly longer than basal portions of segments; neck of penultimate segment half as long as the others. Wing with *R1* barely 1.5 times *Rs*. Hypopygium of the usual type of the genus; tergite narrow; styles tapering to tips with rather short terminal spine. Wing-length 1.3 mm.

♀. Flagellum with 15-17 segments mostly with necks two-thirds as long as basal enlargements, shorter as usual on first few and almost absent on penultimate segment; four sensoria on each segment except the last, these disc-shaped but with a long point, the points (except sometimes one of the four) curved inwards. Last two segments of front tarsi subequal. Wing with *R1* about twice *Rs*. Abdomen only slightly extensile, spermathecae two in number, moderately large, roundish, darkened round edges and paler in middle. Wing-length 1.6-1.8 mm.

BUCKS.: Ivinghoe, 3.x.37, 1 ♂; HERTS.: Welwyn, 22.x.36, 1 ♀ and 30.ix.37, 1 ♀; Hitch Wood, ix.36, 1 ♀ (type) and ix.-x.37, 3 ♀♀; HANTS.: New Forest, 17.x.37, 1 ♀.

Apart from the obsolete veins *M* and *Cu1* (which may be in part due to immaturity of the specimens examined) this species seems rather well distinguished from others with rudimentary empodium by the form of the antennal sensoria.



22

FIG. 22.—*Monardia* small species, and *Pezomyia*. a-e, Wings, about twice scale of most other wings figured; f-h, outlines of ♀ antennae, standard scale; i, j, tips of ♀ front tarsus; k-n, enlarged antennal segments of ♀, standard scale; o-q, spermathecae, standard scale; r-u, hypopygia, r to standard scale, others more enlarged. a, u, sp. indet.; b, h, j, l, *vanderwulpi*, macropterous form?; c, g, k, q, s, *nigricans*; d, i, p, m, t, *monotheca*; e, f, n, o, r, *obsoleta*.

M. monotheca sp. n. (fig. 22. d, i, p, m, t).

A small blackish species, differing from all those described above in having a distinct empodium, which, though narrow, is almost as long as the claws. Eye-bridges two facets wide at origin, three or four at vertex. Palpi 4-segmented, first not very large, with inconspicuous sensory patch above, second, third and fourth subequal. Tibiae with hair-like scales; tarsi with dense narrow scales on last few segments; claws very slightly swollen before the tip. Wings with moderately dense macrotrichia, including a row on *R*₅; *R*₁ about twice *R*_s, which is oblique; costa produced as far as level of tip of *M* (*M*, however, does not distinctly reach the margin); *Cu*₂ very faint at tip, fork moderately wide.

♂. Flagellum with one basal hair-whorl, and one complete oblique crenulate whorl beyond middle, the hairs of which are wider apart and just disconnected at base on dorsal surface; necks of intermediate segments about as long as basal part, that of penultimate segment not much shorter; first few segments with small sensoria similar in shape to those of ♀. Hypopygium (fig. 22, t) of the usual type of the genus and without striking features; tergite very narrow; style with moderate apical spine. Wing-length 1.3 mm.

♀. Flagellum with 11 segments, first long and oval, rest top-shaped, the last few shorter and with less definite necks than those towards the base; each except the last with four sensoria in the form of short-stemmed discs but each with one curved pointed projection towards one side (somewhat as in the last species but less developed). Last segment of front tarsi not at all swollen and barely half as long again as fourth, which is about twice as

long as wide. Only one spermatheca present, this large and disc-shaped, with few pores. Wing-length 1.5 mm.

HERTS.: Welwyn, 30.ix.37, 1 ♂; Hitch Wood, ix.-x.36, 2 ♀♀. Type ♀.

A single male from Ditchley, Oxon., probably represents another species related to the one described above. It is similar in most respects to the Welwyn male, but is larger (wing-length 1.8 mm.), has 3-jointed palpi, and lacks sensoria on the basal flagellar segments; the wing (fig. 22, a) has *M* distinct throughout and the cubital fork rather wider and the hypopygium (fig. 22, u) has the tergite broader and differs in other details.

***M. nigricans* sp. n.** (fig. 22, c, g, k, q, s).

A small black species. Eye-bridges two facets wide at origin, three or four at vertex; front not obviously bilobed. Palpi 3-segmented, first somewhat swollen but without obvious sensoria, second barely twice as long as wide, third not much longer, without scales. Mesonotum with scanty hairs. Tarsi with very narrow, almost hair-like scales; empodium narrow but as long as claws and hairy beneath for its whole length; claws with slight subapical swelling. Wings in both sexes with *R*₁ only about as long as *R*₅; costa reaching as far as tip of *M*, which is very faint; macrotrichia on membrane much sparser than in most other species, so that wing appears paler.

♂. Flagellum with 12 segments as usual, these not much longer than broad with necks mostly a little shorter than basal enlargement, neck of penultimate segment short or very short. Wings very broad. Hypopygium of the usual type of the genus, chiefly notable for the long, stout, terminal spine of the style; connecting bridge of roots of coxites broad. Wing-length 1.1-1.2 mm.

♀. Flagellum with 9-10 segments (usually 10) with very short or scarcely distinguishable necks, exact shape rather variable, but rarely much longer than broad (three rather different specimens shown in fig. 22, k); four (sometimes five) sensoria on each segment except usually the last one, these in the form of short-stemmed discs with the margin at most slightly irregular. Front tarsi with fourth segment not much longer than broad, fifth half as long again as fourth and somewhat stouter. Abdomen moderately extensile; spermathecae two, disc-shaped, darkened round edges. Wings narrower than in ♂; length 1.2-1.5 mm.

HERTS.: Letchworth, not infrequent on windows, vii.-ix.; Hitch Wood, Todd's Green and Breachwood Green (incl. type ♂), at edges of woods, v., ix.-x.; DEVON: Sidmouth, ♀♀ numerous on windows of beach shelter, vi.38; GLOS.: Chedworth, on window, vi.36; OXON.: Oxford Museum windows. SHROPSHIRE: bred, "oats after clover ley," iii.1936 (*H. C. F. Newton*), slides in Barnes Coll., Cecid. 2732-3.

This is evidently very similar to the American *M. gilletti* Felt and *M. torico-dendron* Felt, and is possibly the same as one or other of these; however, I think it more likely that it is one of a group of allied species of which several may occur in Britain, more than one being perhaps represented among the specimens listed above.

The male from Shropshire differs from those from Herts. in having the necks of the flagellar segments only about half as long as the nodes and the penultimate segment devoid of neck; the female bred with this male is aberrant in having pore 5 on *R*₅ instead of on *rm*, a variation which I have not observed in any other species of the tribe.

A very small female from Harrow (taken on window, 2.viii.1915), with 8-segmented flagellum and wing-length only 0.8 mm., probably represents another related species.

Pezomyia Kieffer.

This genus was erected by Kieffer for *Monardia vanderwulpi* De Meij., a species which is normally brachypterous but was said by the describer to occur also in a macropterous form. Hitherto only the brachypterous form has been found in Britain (recorded by me in 1925, *Ent. mon. Mag.* 61: 228 from Barnsley, Yorks.) and I have expressed doubt as to whether de Meijere's macropterous form actually belonged to the same species. However, I have now examined some normally-winged specimens which are in other respects so much like *P. vanderwulpi* that if not actually the same species they must certainly belong to the same genus. These specimens show almost all the characters of *Monardia* as defined above, the only features which one might treat as of sufficient importance for generic separation from *Monardia* being the following: (1) the very short palpi, with second and third segments together only about as long as the first; (2) the entire absence of scales on the legs; and (3) the elongate cerci.

The following is a description of 2 macropterous females taken by Mr. A. H. Hamm in his garden at Oxford, 13.vi.1915:—

♀. Eye-bridges three facets wide. Palpi 3-segmented, first large, with distinct sensory patch above, second and third both small, together hardly longer than first. Flagellum (fig. 22, h) with 10 segments, all except the last distinctly longer than broad, with short but distinct necks and with four disc-like sensoria inserted near tip (fig. 22, l); last segment smaller, pointed, without sensoria. Mesonotal hair short, almost confined to sides and dorso-central stripes. Legs with hairs only, no scales even on tarsi; empodium absent; claws almost smooth; fourth segment of front tarsus less than half as long again as broad, fifth about twice as long as fourth (fig. 22, j). Wings (fig. 22, b) with scanty macrotrichia which are longer and more slender than in most species, some present on *R*₅; *R*₁ not much longer than *R*_s, which is almost transverse (much less definitely oblique than in the other species); costa reaching as far as tip of *M*, which is very faint; *Cu*₂ curved to margin. Halteres normal. Abdomen with moderately extensile tip; cerci unusually long and narrow; spermathecae two, round and of moderate size. Wing-length 1.3 mm.

Two very similar females are in Dr. H. F. Barnes' collection (slides Cecid. 1039–40) labelled "Adel, Leeds, 1928, Caught over hazel stump." In structure of antennae, palpi, legs and abdomen these are exactly like the brachypterous females from Barnsley, and it seems worth noting that the antenna closely resembles that of *M. stirpium* as figured by Kieffer, except that the last segment lacks sensoria.

The following details may be added regarding the typical (brachypterous) form of *P. vanderwulpi* (Barnsley specimens):—

♂. Eye-bridges two facets wide. Flagellar segments (12) with one incomplete and scarcely oblique crenulate whorl, the "crenulation" between the hair-bases lacking on the dorsal surface and the hairs sparser than usual; necks almost as long as basal enlargements, on penultimate segment about half as long. Wings very narrow and strap-shaped, but longer than thorax; *R*₁ very short, *m* scarcely oblique; *R*₅ straight and ending in tip of wing; *Cu* straight, without fork. Halteres represented by minute knobs. Hypopygium small, of the usual *Monardia* type; tergite moderately broad; style rather stout with very small terminal tooth.

♀. Eye-bridges only 1–2 facets wide, facets irregular. Flagellar segments exactly as in the macropterous form. Wings reduced to minute stumps less than half as long as the small thorax and without venation. Halteres absent.

PASSALID COLEOPTERA FROM THE CELEBES

By W. D. HINCKS, M.P.S., F.R.E.S.

THE present paper is based on a small but interesting series of ten examples collected by Mr. G. Heinrich and submitted for identification by Mr. G. J. Arrow. The specimens are preserved in the British Museum and my sincere thanks are due to Mr. Arrow for the opportunity of examining them.

Small though the collection is, there appears to be two forms which are undescribed, a species of the endemic genus *Plesthenus* and a *Macrolinus*. Regarding the former, I long debated whether to erect a new genus for its reception together with Heller's *Plesthenus mandibularis*, but finally I have decided to await further material before doing so.

The distribution of the Celebean Passalid fauna is interesting and has been discussed by Gravely (1918 : 123). Below are listed the species recorded from the islands in the *Coleopterorum Catalogus* (Hincks and Dibb, 1935) together with their known distribution.

List of Celebean PASSALIDAE.

AULACOCYCLINAE.

Comacupes foveicollis ssp. *minor* Heller 1896. Type form from Borneo; subsp. endemic.

Aulacocyclus celebensis Heller 1898. Endemic.

MACROLININAE.

Macrolinus sulciperfectus Kuw. 1891. Endemic.

Macrolinus punctipectus sp. n. Endemic.

Macrolinus duivenbodei Kaup 1868. Endemic.

Macrolinus urus Heller 1898. Endemic.

Acerarius laevicollis (Ill. 1800). Malay Pens., Sunda Is. to Philippines, Celebes?

Plesthenus laminatus sp. n. Endemic.

Plesthenus mandibularis Heller 1900. Endemic.

Plesthenus invitus Kuw. 1891. Endemic.

Plesthenus quadricornis (Kaup 1868). Endemic.

subsp. *gelon* (Schauf. 1885). Endemic.

Plesthenus scutellopunctatus Zang 1903. Endemic. Status doubtful.

LEPTAULACINAE.

Trichostigmus ursulus (Schauf. 1885). Endemic.

Leptaulax planus (Ill. 1800). Burma, Siam, Malay Pens., Sunda Is.

Leptaulax bicolor (Fabr. 1801). Whole Indo-Australian Region.

Leptaulax cyclotaenus Kuw. 1891. Himalayas; Assam, Tonkin, Burma, Malay Pens., Sunda Is.

Leptaulax dentatus (Fabr. 1792). Whole Indo-Australian Region.

Leptaulax anibarbis Kuw. 1898. Borneo, New Guinea.

Leptaulax macassariensis Schauf. 1885. Endemic. Status doubtful.

PROC. R. ENT. SOC. LOND. (B) 7. PT. 11. (NOV. 1938.)

MACROLININAE.

Key to Celebean Species of *Macrolinus* Kaup.

1. Central tubercle of head with free apex . . . *M. duivenbodei* Kaup 1868.
Central tubercle of head without free apex . . . 2.
2. Large, rather convex species (36–42 mm.); elytra usually fused; frontal
ridges obsolete in front . . . *M. urus* Heller 1899.
Smaller (circa 28 mm.); parallel-sided, not very convex; elytra free; frontal
ridges more or less complete . . . 3.
3. Antennal lamellae long and slender . . . *M. sulciperfectus* Kuw. 1891.
Antennal lamellae shorter, especially first three. . . *M. punctipectus* sp. n.

***Macrolinus punctipectus* sp. n.**

Antennae with six lamellae, first three short, distal three moderately long. *Labrum* with anterior margin almost straight. *Head* with depressed areas closely covered with large hair-bearing punctures; outer tubercles symmetrical, conical, somewhat shouldered externally; inner tubercles obsolete; frontal ridges complete but not very clearly defined distad; depressed frontal area with large punctures, surrounding raised areas less punctured; central tubercle not free, more or less ridge-like, meeting in front the conjoined frontal ridges where a small more or less tumid area occurs; a deep longitudinal groove directed caudad from base of central tubercle. *Pronotum* transverse, sparingly punctate above anterior angles and scars; marginal groove expanded distad; median groove distinct and interrupted cephalad and caudad; sides with numerous hair-bearing punctures throughout their length, most dense near scars, fewer in anterior angles. *Elytra* parallel-sided, free, rather depressed dorsad; all striae distinctly but not transversely punctured; lateral grooves more strongly punctured than dorsal; shoulders with distinct though sparse hair-tufts. *Mentum* with a few punctures mesad, strongly and rugosely punctured with long hairs laterad. *Melasternum* impunctate on disc; anterior intermediate and lateral areas also posterior angles with large hairless punctures. *Abdomen* polished, with rugosely punctate scars; base of first segment dull and finely sculptured; posterior intercoxal area dull and rugose; coxal plates punctate; ultimate sternite with impressed apical groove. *Length* 27.5 mm.

Locality: S.O. CELEBES: Berg Tangke Salokko, 1500 m., 1–15.i.1932 (G. Heinrich). *Type and paratype* in British Museum (Natural History).

This species is closely allied to *D. sulciperfectus* Kuw., from which it differs most obviously in having shorter antennal lamellae. Although Kuwert does not directly mention the length of the antennal lamellae in his species I believe I am correct in applying the name to a specimen in the Hincks and Dibb collection from S. Celebes: Bantimoeroeng (C. Ribbe, 1883).

Plesthenus Kaup 1871.

Plesthenus was erected by Kaup in 1871 for *Eriocnemis quadricornis* Kaup, erroneously recorded as from Australia. In the *Coleopterorum Catalogus* (Hincks and Dibb, 1935) four species and one subspecies appear under the genus, all of which are confined to the Celebes except for an unconfirmed record of a single example of *P. invitus* Kuw. from Siwi, New Guinea, made by Moreira (1932). The only recent author to deal with *Plesthenus* is Gravely (1918), who knew *P. invitus*, *P. quadricornis* and *P. gelon* and regarded *P. mandibularis* and *P. scutellopunctatus* as possible varietal forms of *P. quadricornis*. At least in regard to *P. mandibularis* Gravely's suspicion was unwarranted; indeed this species is very distinct from the genotype, *P. quadricornis*. Zang (1906), who was a keen etymologist as well as entomologist, regarded *Plesthenus* as pre-

occupied by *Plisthenes* Stål 1864, and coined the euphonious *Embryulcus* in its stead. The close relationship between the oriental *Pelopides* Kuw. and the present genus is obvious.

Key to species and subspecies of Plesthenus Kaup.

Zang's *P. scutellopunctatus* is unknown to me and is therefore not included. As suggested by Gravely, it may be only a form or variety of *P. quadricornis*.

1. Upper tooth of left mandibles massive, very prominent; lower basal angle of left mandible with strong tooth; anterior lower tooth of right mandible close to terminal teeth and directed forwards; right mandible broad basad with small upper tooth; pronotal scars hairless; lateral elytral grooves distinctly punctate 2.
- Upper tooth of left mandibles normal; lower basal angle of left mandible without tooth; anterior lower tooth of right mandible less close to terminal teeth and directed inwards; right mandible less broad basad with large upper tooth; pronotal scars hairy; lateral elytral grooves almost impunctate 3.
2. Truncature of right outer tubercle oblique; upper angle closer to inner tubercle than to lower angle; left outer tubercle acute; upper tooth of left mandible with more or less straight upper edge and oblique inner surface ending in two tubercles; scars of mentum lightly impressed, not very distinct, widely spaced. L. 48 mm. *P. laminatus* sp. n.
- Truncature of right outer tubercle vertical; upper angle closer to lower angle than to inner tubercle; left outer tubercle truncate; upper tooth of left mandible with outer edge concave, upper inner margin with a median tubercle and another near base; scars of mentum deeply impressed, distinct, less widely separated. L. 34-36 mm.* *P. mandibularis* Heller 1900.
3. Outer tubercles truncate, more or less symmetrical (left a little shorter and narrower than right). L. 45-46 mm.† *P. invitus* Kuw. 1891.
- Outer tubercles asymmetrical; right much larger than left, truncate except when latter is obsolete, then acuminate; left outer tubercle acute or obsolete 4.
4. Right outer tubercle more abruptly truncate; left outer tubercle more strongly developed. Size smaller, 50-55 mm.‡ North Celebes
P. quadricornis quadricornis (Kaup 1868).
- Right outer tubercle acuminate or very obliquely truncate; left outer tubercle more or less obsolete. Size larger, 57-65 mm. South Celebes *P. quadricornis gelon* (Schauf.).

***Plesthenus laminatus* sp. n. (figs. 1-4).**

Antennal club with three short and three long lamellae. *Mandibles*: upper tooth of left mandible massive, very prominent, upper edge more or less straight, an oblique laminate extension on inner face culminating in an anterior and submedian projection (fig. 4); lower basal angle of left mandible with strong tooth; anterior lower tooth of right mandible close to terminal teeth and directed forwards; right mandible broad basad with small upper tooth. *Head* with left outer tubercle apparently acute, simple; right outer tubercle very obliquely truncate, upper angle closed to inner tubercle §; inner tubercles prominent, closer together than are outer tubercles, joined by ridge which also joins them to outer

* Heller gives size as 35-43 mm.

† Gravely records an example without locality as 53 mm. long.

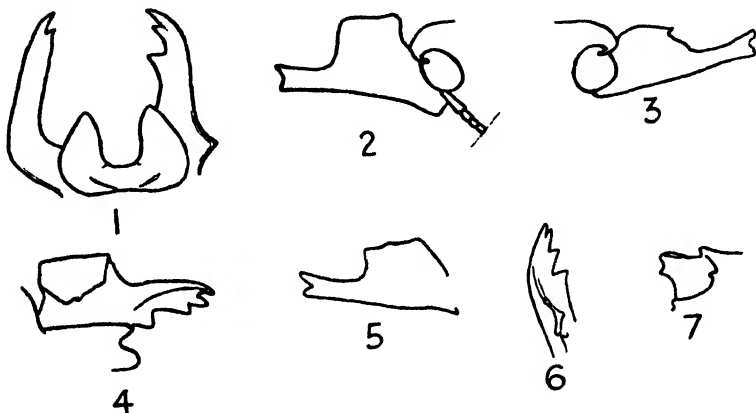
‡ Gravely's measurements are from anterior margin of labrum to apex of abdomen. Mine include mandibles.

§ Or both outer tubercles might be regarded as acute, in which case a secondary tubercle is present on the right side placed nearer to the inner than to the outer tubercle.

tubercles; area enclosed by ridges oblique, roughened; caudal portions of head polished, smooth; central tubercle small. *Pronotum* transverse, impunctate, with hairless scars; median sulcus absent. *Elytra* finely though distinctly punctured laterad. *Mentum* scars rather widely separated, lightly impressed, imperfect in front; side pieces not strongly punctured. *Mesosternum* with distinct oval impunctate scars. *Metasternum* with anterior intermediate areas, lateral areas and posterior angles bearing piligerous punctures; posterior intermediate areas with large umbilicate punctures. *Abdomen* with numerous hair-bearing punctures on first sternite. Length 48 mm.

Type unique in British Museum. *Locality*: CELEBES (*G. Heinrich*).

This fine insect is evidently closely allied to Heller's *P. mandibularis* and may prove to be a large form or subspecies comparable with the subspecies *gelon* (Schauf.) of *P. quadricornis* (Kaup). However, I think this to be unlikely and on the evidence before me I feel compelled to regard the present specimen as a distinct species.



FIGS. 1-7.—1. Underside of mandibles and mentum of *Plesthenus laminatus* sp. n.; 2. lateral view of left mandible of same; 3. lateral view of right mandible of same; 4. inner lateral view of left mandible of same; 5. lateral view of left mandible of *P. mandibularis*; 6. the same, dorsal aspect; 7. dorso-lateral view of right outer tubercle of same.

Plesthenus mandibularis Heller 1900 (figs. 5-7).

CELEBES (*G. Heinrich*): 1 example 36 mm. long.

CELEBES: Latimodiong Geb., 1600 m., 2.viii.1930 (*G. Heinrich*), 1 example 34 mm. long.

Upper tooth of left mandible massive, crested; upper margin, seen from above, triangular, composed of three tubercles, a fourth placed below level of others on inner side (fig. 6). Inner tubercles joined by a strong, straight ridge to each other and to outer tubercles. Outer tubercles "double," the anterior part of head being oblique, so that when viewed from above the outer tubercles appear simple and conical but in side view a further angle is seen below them (fig. 7).

Plesthenus invitus Kuw. 1891.

CELEBES: Ile-Ile, 1300 m., 15.xi.30 (*G. Heinrich*), 1 example.

Length 45 mm. Very similar to small *P. quadricornis* (Kaup), but readily separable by the almost symmetrical outer tubercles and smaller size.

Gravely (1918) records three examples differing somewhat *inter se*: (1) 45.5 mm. Tondano, Minahassa, (2) 45.5 mm. Menado, (3) 53 mm. without locality. The specimen collected by Mr. Heinrich appears to agree with Gravely's (2). Moreira (1928) gives a locality record of this species without further details (except size, 45 mm.) from Siwi, New Guinea. Heller (1900) is the only other author referring to this species and mentions a specimen in the Dresden Museum (No. 9420) in describing his *P. mandibularis*.

Plesthenus quadricornis (Kaup 1868).

N. CELEBES : Magondouw (Staudinger), 9 examples in coll. Hincks and Dibb ; N. CELEBES : Totok (Janson), 2 examples in coll. Hincks and Dibb ; N. CELEBES : Tondano, 1 example in coll. Hincks and Dibb. Apparently not taken by Mr. Heinrich during his stay in the Celebes.

Plesthenus quadricornis gelon (Schauf. 1885).

S.O. CELEBES : Mengkoha Geb., Wawo, 16-30.i.32 (*G. Heinrich*), 1 example.

LEPTAULACINAE.

Leptaulax dentatus (Fabr. 1792).

CELEBES : Bonthain Wawa Karaeng, 1100 m., ix.-x.1931 (*G. Heinrich*), 1 example. This specimen is not typical in the scanty punctuation of the pronotum.

Leptaulax bicolor (Fabr. 1801).

CELEBES : Bonthain Wawa Karaeng, 1100 m., ix.-x.1931 (*G. Heinrich*), 1 example ; CELEBES : Latimodiong Geb., 1000 m. (*G. Heinrich*), 3.viii.1930, 1 example.

The Bonthain example is 19 mm. long and quite typical of this variable species. The second specimen is 24 mm. long and differs in its reduced pronotal and metasternal punctuation.

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NEW SPECIES OF CHRYSOMELIDAE (COLEOPT.) FROM FIJI, BRITISH NORTH BORNEO AND MALAYA

By G. E. BRYANT, F.R.E.S.

(*Entomological Assistant, Imperial Institute of Entomology.*)

CRYPTOCEPHALINAE.

Coenobius marginipennis sp. n.

Pale fulvous; prothorax impunctate, the sides with an oblique depression; elytra finely punctate-striate, narrowly margined with fuscous. L. 2.5 mm.

Head pale fulvous, impunctate, the upper part entirely occupied by the eyes; antennae with the five basal segments fulvous, the six terminal segments tinged with fuscous, and broader, the basal segments very long almost as long as the second to fourth together, the second segment very short and rounded, ♂ with the antennae slightly longer than the ♀. Prothorax pale fulvous impunctate, shining, narrowed in front, the anterior margin with a deep transverse groove, the sides with an oblique groove, the base produced into a lobe at the middle; scutellum pale fulvous, impunctate, narrowly elongate; elytra pale fulvous with narrow fuscous margin, finely punctate-striate, the interstices at the sides slightly convex; pygidium closely punctured and clothed with very fine golden pubescence; legs pale fulvous; underside pale fulvous, clothed with fine scattered golden pubescence, almost impunctate, the first ventral segment very long, the second and third very short about equal, and the apical segment about equal to the second and third together.

FIJI ISLANDS: Labasa, 17.ix.1923, *W. Greenwood*; 3 specimens. Lautoka, 19.iv.1919, Cuvu, 5.viii.1915, *R. Veitch*; 2 specimens. Taveuni, 14.xi.1923, *Dr. H. S. Evans*; 2 specimens.

Type in British Museum from Labasa. Described from 2 ♂♂ 3 ♀♀.

Allied to *C. melanocephalus* Jac., from Mashonaland, but differs in the much finer punctation of the elytral striae, and in the head, apex of the elytra and abdomen not black.

EUMOLPINAE.

Nodostoma musae sp. n.

Broadly ovate, fulvous, nitid, antennae filiform the terminal segments fuscous, prothorax transverse, angled at the sides before base, finely punctured, elytra aeneous, punctate-striate. L. 3-3.50 mm.

Head fulvous finely and not closely punctured, the labrum and palpi fulvous. Antennae long and slender, extending to the middle of the elytra, fulvous with the three terminal segments tinged with fuscous; the third and fourth segments longer and narrower than the remainder; prothorax fulvous, very transverse the sides angulate near the base, obliquely narrowed in front, finely and not closely punctured. Scutellum fulvous, impunctate. Elytra aeneous, subquadrately-ovate, depressed below the base, shoulders prominent and nitid, a strong slightly curved carina at the sides extending from below the shoulder to the middle of the elytra, strongly punctate-striate, the punctures finer towards the apex, the intervals slightly convex. Legs fulvous, the femora armed with a very small tooth, the intermediate and posterior tibiae emarginate at apex. Underside fulvous tinged with fuscous, slightly pubescent, prosternum strongly punctured, the ventral segments of the abdomen, the first the longest, the second to the fourth about equal, with fine scattered pubescence.

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MALAYA: Jelebu, 15.xii.1934, *G. H. Corbett*; 7 specimens. Serdang, 16.i.1935, *G. H. Corbett*; 5 specimens. Kuala Lumpur, 26.i.1925, *G. H. Corbett*; 2 specimens.

Type in the British Museum from Serdang. Described from 14 specimens.

Reported feeding on *Musa sapientum* L. Allied to *N. frontale* Baly from Malacca, but differs in the sides of the prothorax being more angulate, and in the punctuation. This is evidently a very variable species as regards colour.

Entirely fulvous (probably immature), aeneous with the head fulvous, or head and prothorax fulvous with the elytra aeneous. This I have taken as the typical form as the ♂ and ♀ do not differ in colour.

Nodostella pendleburyi sp. n.

Elongate, more or less testaceous, with a metallic tinge, the head and prothorax with darker patches, the elytra with an irregular darker pattern. L. 6 mm.

Head testaceous with darker patches, two between the eyes and one at the base, rugosely punctured, the punctures closer and finer at the base, and fewer on the vertex, the clypeus testaceous. Antennae long and slender extending well beyond the base of the elytra, the two basal segments more swollen, the third slender and twice as long as the second, the remaining terminal segments each about equal to the third. Prothorax strongly transverse, the sides angulate behind the middle, the anterior and posterior margins testaceous, the remainder darker with a metallic tinge, irregularly punctured. Scutellum testaceous, impunctate. Elytra elongate, wider at the base than the prothorax, with a short depression below the base, very feebly punctate-striate, testaceous with an irregular pattern of darker markings. Legs testaceous, the apical portion of the femora black, and the tibiae with the apex darker, the four posterior tibiae strongly notched at the apex. Underside testaceous, the ventral segments of the abdomen about equal and almost impunctate.

BRITISH N. BORNEO: Mt. Kinabalu, Pakka, 10,000 ft., 23.iii.1929, *H. M. Pendlebury*; 3 specimens, 1 ♂ 2 ♀♀.

Type in the British Museum, ♂. Described from 1 ♂ 2 ♀♀.

This belongs to the genus *Nodostella* proposed by Jacoby for *Nodostoma elongata* Jac., which should probably include many elongate species in the genus *Nodostoma*.

Colaspoides vitiensis sp. n.

Reddish-brown, with a metallic gloss, the antennae and legs slightly paler. L. 4.50 mm.

Head depressed, distinctly punctured, more closely between the eyes; antennae elongate, extending a little beyond the middle of the elytra, the second segment half as long as the first and third, the third to the sixth subequal to each other, the four apical segments a little shorter and broader; prothorax transverse very convex, contracted in front, with large irregularly distributed punctures; scutellum impunctate, subtriangular; elytra with not very dense, but rather large punctures, becoming smaller and in regular striae posteriorly; legs slightly paler and pubescent, the femora unarmed; sternum shining and impunctate, the ventral segments of the abdomen with short scarce pubescence, the first segment the longest, about equal to the three following, the second to the third about equal to each other.

FIJI ISLANDS: Makogai, Viti-Levu, 20.i.1921, *Dr. H. S. Evans*; 1 ♀ specimen, type. Tamavua, 24.v.1927, *H. W. Simmonds*, 1 specimen ♀. Nausori, x.1930, *R. Veitch*; 2 specimens ♀♀.

Type in British Museum. Described from 4 females.

Somewhat allied to *C. tarsalis* Lea but differs in size and in the punctures, and belongs to the group with femora unarmed.

HALTICINAE.

Chabria kinabalensis sp. n.

Black, the head and thorax nitid, the elytra rugosely and somewhat confluent punctured, almost shagreened, strongly rounded and very convex, black, each with a round flavous spot at the base. L. 3 mm.

Head black and nitid, the antennae black and extending slightly beyond the base of the elytra, the eight terminal segments pubescent and about equal to each other, the three basal glabrous and obscurely fulvous. Prothorax transverse, black, nitid, impunctate, the sides feebly rounded, the anterior angles oblique. Scutellum black triangular. Elytra rugosely and somewhat confluent punctured, strongly convex, rounded, widest behind the middle, a round flavous spot in the middle of each at the base, their epipleurae very broad. Legs black, the posterior femora incrassate, the tibiae with a distinct spine at the apex. Underside black and nitid, the metasternum with a horseshoe-shaped plate, the ventral segments of the abdomen about equal to each other, almost impunctate.

BRITISH N. BORNEO: Mt. Kinabalu, Pakka, 10,000 ft., 23.iii.1929, *H. M. Pendlebury*; 5 specimens.

Closely allied to *C. (Sphaeroderma) bimaculata* Jac., from Sumatra, but differs in the very rugosely punctured elytra and its larger size.

Type in the British Museum. Described from 5 specimens.

Nesohaltica vitiensis sp. n.

Oblong, shining black; antennae fulvous with the four apical segments fuscous. Legs and underside pitch brown. L. 2 mm.

Head with the basal half shining black, impunctate, the front pitch brown, a transverse impressed line between the eyes; antennae extending almost to the middle of the elytra, the seven basal segments fulvous, the four terminal fuscous, the first segment longer and more swollen than the second, the remainder more slender and about equal to each other. Prothorax shining black, transverse very finely and sparingly punctured, the sides slightly rounded and margined, the anterior angles obliquely truncate. Scutellum shining black, impunctate, triangular. Elytra shining black, strongly and somewhat closely punctured, the sides parallel and rounded at the apex, the side margins with a line of evenly spaced punctures which are much stronger than the other elytral punctures. Legs and underside pitch brown.

FIJI ISLANDS: Labasa, ix.1932, *R. Veitch*; 1 specimen, type. TAVEUNI, 29.ii.1924, *Dr. H. S. Evans*; 1 specimen, from Guava spinney.

Type in the British Museum. Described from 2 specimens.

Closely allied to *N. atra* Bryant from New Hebrides, but differs in its more shining black appearance and the punctation of the elytra.

Crepidodera evansi sp. n.

Elongate-ovate, nitid, fulvous, with the exception of the five apical segments of the antennae, the suture and sides of the elytra fuscous. L. 3 mm.

Head fulvous, nitid, impunctate, a short longitudinal carina between the base of the antennae, head with the eyes, not so broad as the prothorax. Antennae extending almost to the middle of the elytra, the six basal segments fulvous, the five terminal fuscous and slightly pubescent, the two basal segments more swollen than the remainder, the second about half as long as the first, the third and fourth about equal, each longer than the second, the fifth slightly longer than the fourth or sixth. Prothorax fulvous, nitid, impunctate,

transverse, the sides feebly rounded, slightly contracted at the base, the anterior angles oblique, a transverse sulcus at the base not very deep, terminated at each end by a short longitudinal sulcus. Elytra about twice as long as the head and prothorax together, fulvous, the suture and sides fuscous, feebly punctate-striate, the apical portion impunctate, feebly carinate at the sides, widest behind the middle and rounded at the apex. Legs fulvous, the apical third of the posterior tibiae finely toothed. Underside fulvous.

FIJI ISLANDS : Taveuni, Quilai, 800 ft., 18.x.1924, *Dr. H. S. Evans*; 2 specimens.

Type in the British Museum. Described from 2 specimens.

Easily distinguished from *C. nigra* Bryant, the only described species from Fiji, by its larger size, colour, etc.

Alema nigra sp. n.

Shining black, with the exception of the antennae, clypeus, palpi and legs fulvous. L. 2 mm.

Head with the eyes rather large, the basal portion shining black and impunctate, the space between the eyes elevated, the clypeus and mouthparts fulvous. Antennae long and slender, the first segment thicker than the following, the second rather shorter than the first, the remainder elongate and slender, about equal to each other, the five terminal segments are tinged with fuscous and pubescent. Prothorax shining black, feebly punctured, scarcely broader than the head, subquadrate, slightly depressed near the base, the sides feebly margined. Scutellum black and impunctate. Elytra shining black, finely punctate-striate, the interstices being slightly elevated, elongate, the sides nearly parallel, tapering sharply to the apex, the extremity of the pygidium slightly projecting beyond the elytra. Legs fulvous. Underside shining black, metasternum impunctate, the first ventral segment of the abdomen very long, about equal to the following three, which are all short and about equal, the apical segment long and feebly punctured.

FIJI ISLANDS : Lautoka Mts., 23.x.1921, *W. Greenwood*; 1 specimen.

Type in the British Museum. Described from 1 specimen.

I prefer to place this in the genus *Alema* Sharp, but it may form a connecting link between this and *Liprus* Motschulsky.

Psylliodes simmondsi sp. n.

Elongate-ovate, above purple black, the antennae legs and underside fulvous. L. 2.5 mm.

Head with the basal half black, impunctate, the clypeus and palpi fulvous. Antennae fulvous, with the five terminal segments tinged with fuscous, extending to the middle of the elytra, the two basal segments the stoutest. Prothorax black with purple reflections, feebly and not closely punctured, widest at the base, contracted in front, the anterior angles obtuse. Scutellum triangular, impunctate. Elytra purple black, broader than the base of the prothorax, the sides subparallel and rounded at the apex, irregularly punctured, the punctures stronger and closer than on the prothorax. Legs fulvous, the hind femora tinged with fuscous, the apical process of the hind tibiae is short and tridentate. Underside fulvous, the ventral segments of the abdomen paler.

FIJI ISLANDS : Tamavua, 3.iv.1927, *H. W. Simmonds*; 1 specimen.

Type in the British Museum. Described from 1 specimen.

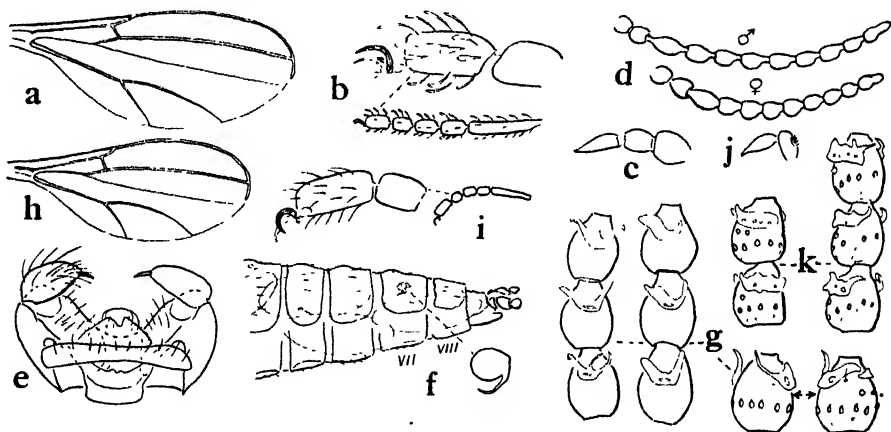
Somewhat allied to *P. quadridentata* Baly from West Australia, on account of the short apical process to the hind tibiae.

ON THE BRITISH LESTREMINAE, WITH NOTES ON EXOTIC SPECIES.—7. (DIPTERA, CECIDOMYIIDAE)

By F. W. EDWARDS, M.A., Sc.D., F.R.E.S.

Mycophila Felt.

THIS genus was founded on a single species with reduced male antennae, the flagellum in the genotype having only ten segments, instead of twelve, as is the case in all other genera of the tribe except *Micromyia*. I am acquainted with two British species which though very distinct from one another in many ways are certainly congeneric with the genotype, *M. fungicola* Felt. The following re-definition of the genus is based on a comparison of these two species.



23

FIG. 23.—a-g, *Mycophila barnesi* sp. n. h-k, *M. speyeri* Barnes. a, h, ♀ wing (twice standard scale); b, i, front tarsus; c, j, palpus; d, outline of antennae; e, hypopygium (twice standard scale); f, ♀ abdomen with spermatheca enlarged; g, k, antennal segments of ♀, different specimens.

Eyes undivided, but bridges narrow, 1-2 facets wide. Palpi short, 2-3 segmented, terminal segment pointed. Antennal flagellum of ♂ 9-10-segmented, without definite crenulate whorls, necks all short; of ♀ 7-9-segmented, sensoria broad and more or less lobed, two on each segment. Mesonotum with few or no hairs between dorso-central rows. Tarsi with or without scales; claws simple; empodium small or absent. Wings with macrotrichia of membrane not very dense; costa reaching nearly as far as the obsolete tip of *M*; *R*₁ very short; pore 5 on *rm*.

Hypopygium: tergite narrow but complete; cerci well developed; ooxites broadly united ventrally, their internal roots connected by a broad bridge; style with terminal spine; aedeagus slipper-shaped, genital rod absent or indistinct. Abdomen of ♀ not at all extensile, tergites 2-8 all well developed; a single very small spermatheca present. Eggs very large for the size of the insect (as in the subfamily HETEROPEZINAE).

M. barnesi sp. n. (fig. 23, a-g).

A small, rather bright red species (in life). Palpi 3-segmented; division between second and third not always well marked, but these two together markedly longer than first first without definite sensory patch; third evenly tapering to the sharp tip. Tarsi rather densely clothed with hairs and small scales; empodium short but distinct, its length (excluding the hairs) nearly half that of the claws.

♂. Flagellum 9-segmented, terminal segment constricted in middle, necks less than one-third as long as rest of segments. Hypopygium as figured. Length of body or wing about 1 mm.

♀. Flagellum 9-segmented, terminal segment with distal half smaller, no definite necks; sensoria variable in shape, usually with two spreading lobes, one finger-like, the other broader, but not infrequently irregularly trilobed; in any case each sensorium arises from a single pore. Length of body 1.3-2 mm.; wing 1-1.2 mm.

HERTS.: Letchworth, 1 ♂, 17 ♀♀ on windows, including type ♂. OXON.: Oxford Museum windows, 2 ♀♀ (*Hamm*). CORNWALL: St. Germans, 10 ♀♀ reared from mushrooms, iv.31 (*E. R. Speyer*). LANCS.: Longsight, Manchester, reared from manure, vii.32 (*M. Shields*).

This is evidently nearly related to the Californian *M. fungicola* Felt, the antennal sensoria being quite of the same type; *M. fungicola*, however, is said to have only 9-segmented antennae in the female (i.e. presumably 2 + 7) and its size is given as only 0.6 mm. in both sexes, which is considerably less than the smallest *M. barnesi* I have seen; the empodium of *M. fungicola* is described as rudimentary and the number of palpal segments is not given.

Larvae obtained by Mr. Speyer from Cornwall resemble those of *M. fungicola* in having no spatula.

M. speyeri Barnes (fig. 23, h-k).

A still smaller species than *M. barnesi*. Palpi 2-segmented, first segment with distinct sensory patch above, second inserted below tip of first and hardly longer, its inner margin slightly excavated. Tarsi with hairs only, at least no obvious scales in the specimens available; empodium rudimentary, represented only by a few short hairs. Wings with macrotrichia of membrane very scanty, much more so than in *barnesi*.

♂. Flagellum with 9 segments, the terminal segment globular, but sometimes confluent with the eighth, so that the number of segments is one fewer than in *barnesi*. Hypopygium much as in *barnesi*. Length of body or wing 0.7 mm.

♀. Flagellum with 8 segments; sensoria in the form of broad plates with more or less irregular margins but not deeply lobed, though there may be a short finger-like projection on one side; the two sensoria nearly but not quite meeting, each arising from several small pores. Length of body 1 mm.; wing 0.8 mm.

HERTS.: Cheshunt; larvae feeding on mushroom mycelium under glass (*Speyer*).

The above redescription has been prepared from specimens from the original series presented to the British Museum by Mr. Speyer. No further records of the species are available; material at one time determined as *M. speyeri* from Cornwall and Manchester proves on re-examination to be *M. barnesi*.

Micromyia Rond.

This genus was erected for a single European species, *M. lucorum* Rond., which was redescribed by Winnertz. Two of Winnertz's German specimens

are in the British Museum; I have mounted one of these for study, and have also examined the specimens (7 ♂♂, 1 ♀) in Winnertz's collection in Bonn, besides a few British specimens as noted below. The genus is well differentiated in the male sex from most others in the tribe (except *Ceratomyia* and *Tricampylomyza* *) by the peculiarly short antennae, but the female is not so readily distinguished; the most obvious feature applicable to both sexes which will separate *Micromyia* from other genera of the tribe found in Britain is the almost right-angled cubital fork. The following diagnosis may be given:

Eye-bridges narrow, only 1-2 facets wide for the most part, but broader at vertex; the facets irregular, so that the form of the eye approaches that found in *Campylomyza*. Palpi short, 3-segmented. Antenna of ♂ with first segment small, second much larger; flagellum of 7-9 segments without verticils but each bearing only a few hairs, the first five at least small, short, without necks. Antenna of ♀ also short, flagellar segments sessile but larger than in ♂; sensoria forming an interrupted ring. Tarsi with small scales; on front legs first segment only half as long as remaining four together; claws simple, much longer in ♂ than in ♀; empodium narrow but nearly as long as claws. Wings with rather scanty macrotrichia, especially in ♂; *R*₁ about equal to *R*_s; costa produced about to level of tip of *M*, but *M* very faint, even when stained. *Cu*₂ at right angles with *Cu*₁, reaching margin; pore 5 on *rm*. Hypopygium as in *Mycophila*, except that the style has no distinct apical tooth. Abdomen of ♀ slightly extensile; a single large spermatheca.

M. lucorum Rond. (fig. 24).

(*Campylomyza globifera* Hal.)

A small black species, superficially resembling *Monardia nigricans* Edw.

♂. Flagellum in a mounted German ♂ 7-segmented, the first six very short, the seventh long and evidently composed of three short segments fused together (specimens described by Haliday evidently had these three segments separated); the last few segments are much more slender than the three at the base and their number may well be variable. Palpi with first segment not very stout, second longer than third. Tarsi slender, the fifth segment a little stouter, widened apically; claws about as long as fifth segment but not very stout. Wings pale and translucent, with scanty macrotrichia. Hypopygium very small. Wing-length about 1.2 mm.

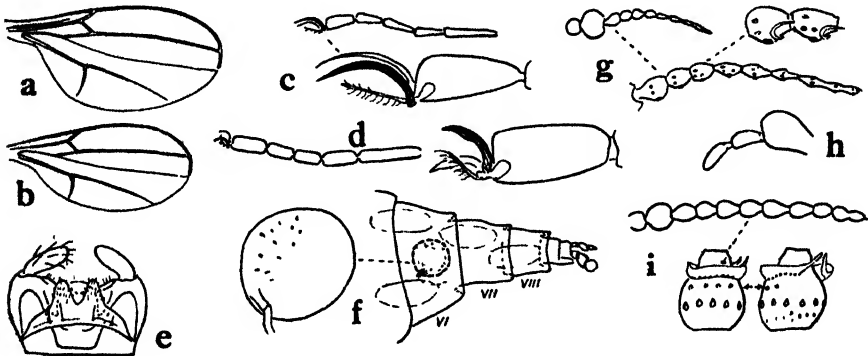
♀. Antennae with second segment somewhat larger than first, but less markedly so than in ♂; the flagellar segments, on the other hand, are relatively stouter, eight in number, the terminal one double, with median constriction. Palpi with first segment very stout, second and third subequal. Sensoria forming an almost complete ring, somewhat as in *Campylomyza*, but here the ring is narrowly interrupted on one side, each end being produced into a finger-like process; the ring arises from numerous small pores. Tarsi less slender than in ♂; claws only half as long as fifth segment. Wings with much more numerous macrotrichia than in ♂, but venation similar. Spermatheca very large and disc-shaped. Wing-length 1.5 mm.; body (extended) nearly 2.5 mm.

OXON.: Hogley Bog, 2.vii.1911, 1 ♂ as prey of *Hilara maura* Mg., and Oxford Museum, 5.vii.21, 1 ♂ (*Hamm*). HERTS.: Letchworth, 1 ♀ on window, ix.36.

* These two genera are unknown to me. *Ceratomyia* (genotype *C. johannseni* Felt, of California) is described as having vein *M* absent and the first front tarsal segment as long as the remaining four together; *Tricampylomyza* (genotype *T. parvula* Kieffer of West Africa) is said to have the eyes divided (as in *Campylomyza*) and the palpi only 1-segmented; in most other respects both resemble *Micromyia*.

As this is the only European species of this group of genera known to me with a right-angled cubital fork I believe the sexes are correctly associated; the Letchworth female is in all respects similar to the one in Winnertz's collection placed with males of *M. lucorum*, which has also 2 + 8 antennal segments (not 8 as stated by Winnertz); Rondani's statement that the female of *lucorum* had six antennal segments may also have been erroneous.

The British Museum possesses a series of males from Weenen, Natal (*Thomasset*), and Waldia, Abyssinia (*Macfie*), also one from Accra, Gold Coast (*Macfie*), which differ little if at all from German and British males of *lucorum*; I believe that all belong to the same species.



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FIG. 24.—*Micromyia lucorum* Rond. a, ♂ wing (Germany); b, ♀ wing (coll. Winnertz); c, ♂ front tarsus; d, ♀ front tarsus (Letchworth); e, ♂ hypopygium; f, tip of ♀ abdomen and spermatheca (Letchworth); g, ♂ antenna; h, i, ♀ palpus and antenna (Letchworth) to scale of g.

Joannisia Kieffer.

(*Camptozoa* End.)

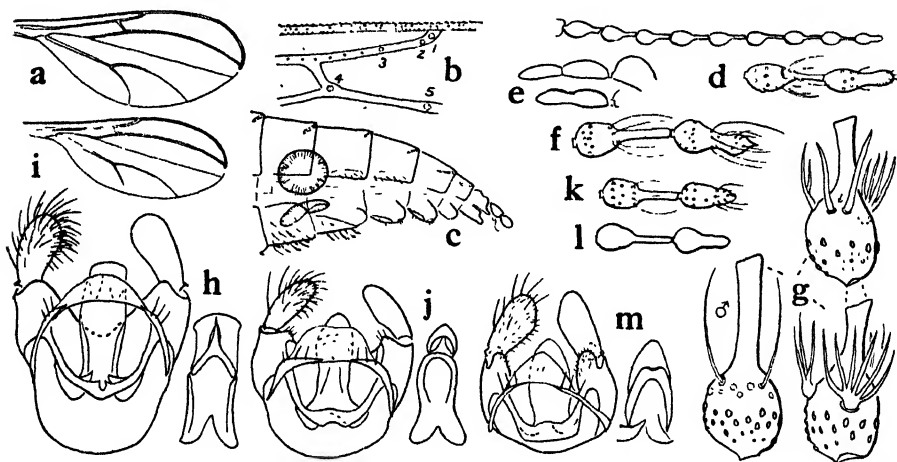
The following diagnosis is based on the comparison of over a dozen species, including *J. sanguineu* Kieff. and *J. kiefferiana* End.

Eye-bridges complete, 2-3 (rarely 4) facets wide. Front not prominent. Palpi 3-4-segmented, never very long, first segment somewhat enlarged. Antennae of ♂ with 2 + 12 segments, but the terminal one usually divided by a more or less conspicuous constriction, so that the number appears at first sight to be 2 + 13; flagellar segments with slender necks which are usually longer than the nodes and are not inserted eccentrically as they are in most other genera of the tribe; nodes usually almost globular, the verticils "campanuliform" (as in *Psychoda*), i.e. tending to enclose a cup-shaped space, less spreading than in the other genera; no crenulate rings associated with the verticils even when the hairs are closest together. Antennae of ♀ with 2 + 9 (rarely 2 + 8 or 2 + 10) segments, the terminal one less constricted than in ♂; necks nearly always long, but not so long as in ♂ and nodes usually more oval; sensoria in the form of stout pale bristles (rarely branched), 2-4 in number on each segment.

Mesonotum with the hairs mainly confined to the sides and dorso-central stripes. Legs with scales mixed with hairs on femora and tibiae, vestiture of tarsi composed mainly of scales which are usually fairly broad. Empodium narrow, slightly hairy, nearly or quite as long as claws; claws simple but often more or less thickened subapically; last segment

of front tarsi of ♀ neither swollen nor darkened. Wings with a more or less dense vestiture of short curved hairs or scales. *R* running near costa so that *Sc* is often not traceable; *R*₁ 2-3 times as long as *R*₂; costa ending either abruptly at tip of *R*₅ or very slightly beyond (at most to a distance but little greater than the width of the vein); *R*₅ rather strongly curved; *M* and *Cu*₁ often faint; *M* straight; pore 5 on *R*₅, well beyond pore 4.

Abdomen of ♂: Tergites 6-8 all reduced to very narrow transverse strips, the end of the abdomen contracted and the hypopygium folded over as in *Campylomyza*. Tergite 9 very narrow and usually interrupted in middle, forming a pair of somewhat crescent-shaped strips connected by membrane and bearing few or no hairs; anal segment may be fairly large but entirely membranous. Coxites extensively fused beneath. Style with or without terminal tooth. Aedeagus slipper-shaped; no genital rod. Abdomen of ♀ not markedly extensile; spermathecae (when present) two, larger in some species than in others, and either sclerotised or not, sometimes apparently absent.



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FIG. 25.—a-h, *Joannisia ramosa* sp. n. a, ♂ wing; b, portion of wing enlarged to show pores; c, tip of ♀ abdomen with spermathecae; d, outline of ♀ antenna with tip enlarged; e, palpus showing variation; f, tip of ♂ antenna; g, antennal segments ♂♀; h, hypopygium with aedeagus shown separately; i-k, *J. trimera* sp. n.: i, ♂ wing; j, hypopygium with aedeagus; k, tip of ♂ antenna; l, m, *J. ovalis* sp. n.: l, tip of ♂ antenna; m, hypopygium.

Kieffer grouped the species according to whether the costa extends slightly beyond the tip of *R*₅ or not; Enderlein in adopting this division proposed the name *Camptozoa* for those species (*kiefferiana* End., *palustris* Kieff.) in which the costa ends abruptly at the tip of *R*₅, leaving the others in *Joannisia*. This character by itself is of little importance, and is often difficult to appreciate; better characters for the division of the genus are to be found in the condition of the spermathecae of the female, the width of the scales on the femora, and the presence or absence of scales on the abdominal tergites.

The genus evidently includes a large number of species and is cosmopolitan in distribution; I have seen specimens from Brazil, Argentine and New Zealand.

J. ramosa sp. n. (fig. 25, a-h).

A brownish species; mesonotum with light brown ground colour and three dark brown stripes, which are usually just separate but may be confluent. Palpi 3-segmented, second and third segments subequal (in one specimen fused together). No membranous area between scutum and scutellum. Dorso-central hairs rather long but not dense, no scales mixed with them. Abdominal tergites almost completely bare; sternites with some hairs mixed with a few narrow scales. Legs clothed with hairs and scales; on femora and tibiae the scales are very narrow, at least six times as long as broad and mostly almost hairlike, on tarsi broader, shorter and denser. Wings clothed moderately densely with curved, slightly flattened hairs, some towards base slightly broadened but hardly recognisable as scales; *R*₁ over twice *R*_s; costa produced beyond *R*₅ for a distance fully equal to its width; *Cu*₂ curved to margin but very faint at tip.

♂. Flagellar segments with a sparse whorl of pale sensorial hairs close to base of neck; last segment constricted in middle. Hypopygium large, of distinctive form owing to the great development of the sternite; coxites not lobed at tip; styles broadest near tip, hairy, without spine; anal segment rounded in middle, not bilobed. Length of wing 1.2, antenna 1.4 mm.

♀. Flagellum 9-segmented, terminal segment long and slightly constricted beyond middle; sensoria three in number on most segments, branched from the base into 3-6 branches. Spermathecae very large, disc-like, extensively darkened round edges, lying in fourth or fifth abdominal segment; sternites 6-8 represented by narrow mid-ventral strips. Length of body (extended) about 1.8-2 mm.; wing 1.3 mm.

HERTS. : Letchworth, summer 1936-7, 3 ♂♂, 8 ♀♀ on windows (incl. type ♂).
OXON. : Oxford Museum, 8.vii.20, 1 ♂ (*Hamm*).

The female of this species differs in the branched antennal sensoria from all others of the genus known to me or hitherto described.

J. trimera sp. n. (fig. 25, i-k).

♂. Differs from *J. ramosa* as follows : Scales of tibiae more hair-like; femora and sternites with hairs only. Terminal segment of antenna less constricted. Wings somewhat narrower, *Cu*₂ not reaching margin. Hypopygium with the sternite much less developed; styles not so broad; aedeagus differently shaped. Wing-length 0.9 mm.

HERTS. : Letchworth, summer 1936, 1 ♂ on window.

J. ovalis sp. n. (fig. 25, l, m).

♂. Closely resembles *J. trimera* except for details of hypopygium : coxite with rounded and finely pubescent apical dorsal lobe; style broadest in middle; aedeagus differently formed. Wing 0.9 mm.

HERTS. : Letchworth, viii.1936, 1 ♂ (type) and viii.1937, 1 ♂.

J. albicornis (Mg.) (fig. 26, d, e).

(*Campylomyza albicornis* Mg.)

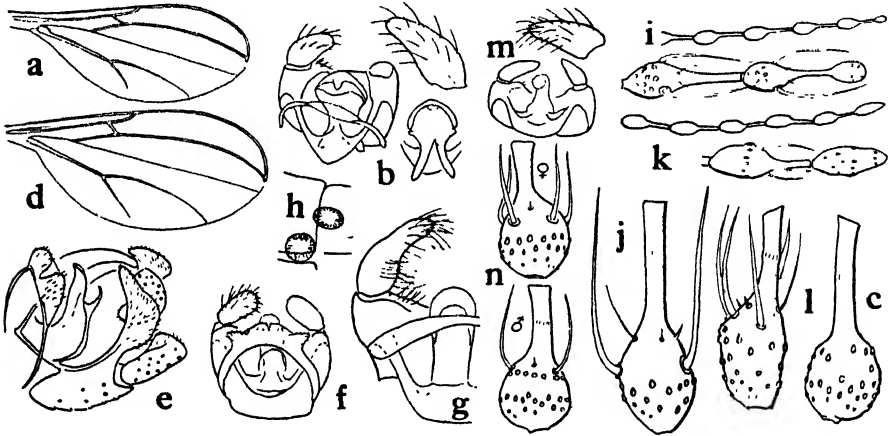
♂. Meigen's type (lacking head) has the wing-venation as in the last two species, but has a very distinctive hypopygium : coxite with greatly developed pubescent dorsal apical lobe shaped like a broad sickle; style bent in middle; anal segment bilobed. Wing-length about 1.3 mm.

J. intermedia Kieff.

This is figured as having the male style bent in middle somewhat as in *albicornis*, but R1 is said to be 3-4 times *Rs*. Palpi not specifically mentioned; presumably 4-segmented as in *sanguinea*.

J. perpusilla (Winn.) (fig. 26, g).

In Winnertz's collection in Bonn are six males under this name. I mounted two of these and found one to have a hypopygium like that of *J. sanguinea* Kieff.; the four unmounted specimens appeared to be similar, but the second mounted specimen proved to be quite different, with a hypopygium as in fig. 26, g (though with 4-segmented palpi and constricted terminal segment of antenna as in *sanguinea*). In order that the names *perpusilla* and *sanguinea* may both be conserved, I propose to regard this last specimen as the type of *perpusilla*.



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FIG. 26.—*Joannisia* spp. a-c, *cornuta* sp. n., ♂ wing, hypopygium and antennal segment; d-e, *albicornis* Mg., type ♂, wing and hypopygium; f, *roralis* sp. n.; g, *perpusilla* Winn., hypopygium; h-j, *cornuta* sp. n.; k-l, *bicolor* sp. n., ♀, spermathecae, outline of flagellum and enlarged segment; m, n, *sanguinea* Kieff., hypopygium and antennal segments (♂♀) of types. (To scale of corresponding parts in fig. 25, g somewhat larger.)

J. sanguinea Kieff. (fig. 26, m, n).

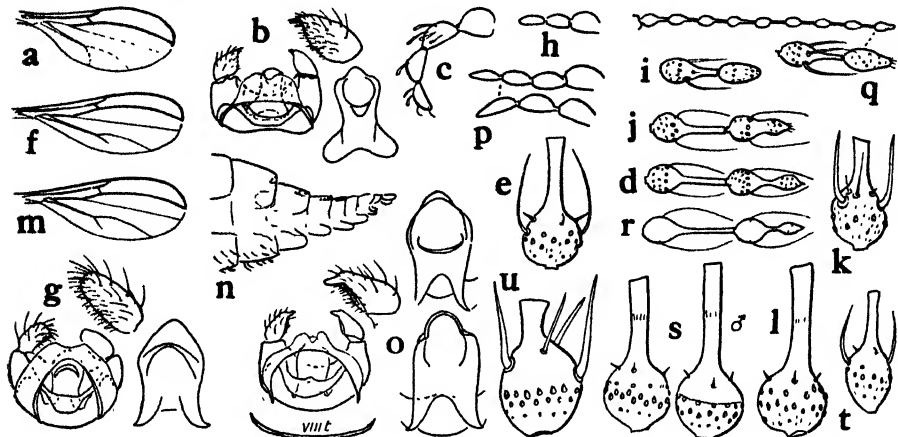
Costa produced slightly but distinctly beyond tip of *R*5. Scales on femora and tibiae very narrow. Palpi 4-segmented, fourth segment somewhat smaller than third. Fourth segment of tarsi somewhat longer than in *ramosa* and related species, on front legs nearly twice as long as broad.

♂. Flagellar segments with whorl of hairs near base of neck, and distal to this with two rather thick sensorial hairs; neck only about as long as nodes; last segment (according to Kieffer) deeply constricted. Tergites 6-8 linear as usual, not enlarged in middle. Hypopygium small, style tapering to the tip, without spines; aedeagus narrow; anal segment (according to Kieffer's figure) bilobed. Length of wing 1.0 mm.

♀. First five flagellar segments with necks somewhat shorter than nodes, which are broadly oval; four moderately stout, simple sensoria reaching just to end of neck. Spermathecae darkened, but extremely small, not one-fifth the diameter of those of *J. ramosa*.

though the insects are of about the same size. Length of body (extended) about 1.8 mm., wing 1.2 mm.

Redescribed from 2 ♂♂, 3 ♀♀ from Kieffer's original series, now in the Berlin Museum. Some specimens in Winnertz's collection in Bonn under the name *Campylomyza perpusilla* are apparently this species (see above).



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FIG. 27.—a-e, *Joannisia muscorum* Kieff (?); f-l, *J. caricis* Kieff. (?); m-t, *J. palustris* Kieff. (?); u, *J. kiefferiana* End., type ♀. a, f, m, ♂ wings; b, g, o, hypopygium with style and aedeagus on larger scale; c, h, p, palpi; d, j, r, tips of ♂ antennae; i, q, tips of ♀ antennae and outline of flagellum; e, l, s, enlarged segments of ♂ antennae; k, t, u, of ♀ antennae. (Some variations shown in case of *palustris*.)

J. cornuta sp. n. (fig. 26, h-j).

Very similar to *J. sanguinea*, which it resembles in having the costa produced slightly beyond *R*₅; palpi 4-segmented, with the fourth segment somewhat smaller than the third; femora and tibiae with all the scales very narrow, almost hair-like.

♂. Last segment of antenna deeply constricted, as in *ramosa* and *sanguinea*. Differs chiefly from *sanguinea* in form of aedeagus, which is much broader; internal loop of coxites projecting somewhat beyond the small sterno-coxite. Wing-length 1.3 mm.

♀. Flagellum unusually long, but in the single specimen at hand only 8-segmented, the terminal one with an oval distal node separated from the larger basal node by a longish neck (the terminal node presumably representing the ninth segment, and perhaps normally separate); nodes elongate-oval, necks very long; only two sensoria on each segment, these very long and rather stout. Abdominal vestiture as in *ramosa*; spermathecae extensively darkened round edges, but only about half the diameter of those of *ramosa*. Length of wing 1.3 mm.; body (extended) 2.3 mm.

HERTS.: Letchworth, on window; 1 ♂, summer 1935, 1 ♀ (type) summer 1936.

I am not sure that these two specimens belong to the same species, and regard the female as the type, as its antennal characters seem more distinctive than the small details on which the male is separated from *J. sanguinea*.

J. roralls sp. n. (fig. 26, f).

♂. Very like *J. sanguinea* and *cornuta*, but with quite distinct hypopygium: style shorter and broader, and anal segment with a pair of triangular divergent lobes. Antennae

as in *ramosa*, with necks much longer than nodes; hairs similarly arranged and terminal segment similarly constricted. Palpi broken in both specimens (only 2-3 segments remaining; perhaps normally 4-segmented). Scales on femora and tibiae very narrow. Length of wing 1.2 mm.

HERTS.: Harpenden, 16.viii.1934, 2 ♂♂ (one the type) taken in light-trap at dawn (*C. B. Williams*).

The form of the anal segment appears distinctive, the two specimens being alike in this and other respects. The hypopygium has some resemblance to that of *J. caricis* as determined below, but the wings and antennae indicate a closer relationship with *J. trimera* or *sanguinea*.

***J. bicolor* sp. n. (fig. 26, k, l).**

♀. Flagellum 9-segmented; terminal segment elongate-oval, as large as node of penultimate; necks rather shorter than nodes; four moderately stout sensoria on most segments, two of them close together on the more gibbous ventral side of the node. Palpi (so far as can be seen in the dry specimen) 3-segmented. Thorax: Mesonotum mainly shining black, with a nearly circular membranous yellow area posteriorly, placed half on the scutum and half on the base of the scutellum; dorso-central hairs very short, pale; scutellum with eight marginal dark hairs, in two groups of four. Legs pale, clothed with small scales, those on femora narrow but distinct. Wings much as in *ramosa* and similar species, but *Cu*2 slightly curved at base, not straight. Abdomen yellowish; tergites not at all darkened and quite bare; sternites with some pale hairs but no scales. Length of wing 1.7 mm.

HERTS.: Letchworth, vi.1937, 1 ♀ (type) on window.

This specimen differs from all others of the genus that I have seen in the membranous yellow patch on the mesonotum, which contrasts strikingly with the general black colour of the dorsum. On this account I think it must belong to a different species from any of those described here from the males only.

***J. muscorum* Kieff. (?) (fig. 27, a-e).**

A small brownish species with pale legs; costa produced very distinctly beyond tip of *R*5, but in contrast with the other species with similar venation the scales on femora and tibiae are fairly broad (one-quarter as broad as their length, if not more) and those of the tarsi still broader (about half as broad as their length). Mesonotum with many scales mixed with the dorso-central hairs; no membranous area before or on scutellum; abdominal sternites with numerous small narrow scales but tergites almost entirely bare. Palpi 4-segmented, all segments with scales, fourth segment smaller than third. Vestiture of wings not very dense, in the form of narrow, pointed scales. *R*1 not much longer than *Rs*.

♂. Flagellar segments with the most distal whorl of hairs not much beyond middle of node and very sparse; terminal segment with narrow neck-like constriction in middle. Tergites 6-8 forming linear strips as in most other species of the genus, not widened in middle. Hypopygium small; anal segment bilobed; style short, broad in middle but pointed, with a few small, sharp spines close together at tip. Length of wing 1.0 mm.

♀. Not recognised in Britain.

HERTS.: Letchworth, summer 1936, 4 ♂♂ on window.

***J. caricis* Kieff. (?) (fig. 27, f-l).**

A small species with costa ending abruptly at tip of *R*5, and no obvious scales on femora or mesonotum; very narrow scales on tibiae, and even the tarsal scales not very

broad (about one-quarter as broad as their length). Palpi 3-segmented in all specimens examined, and without scales. Vestiture of wings composed of slightly flattened hairs; *R*₁ nearly twice *R*_s; *Cu*₂ abbreviated. Abdominal tergites bare; sternites with a few hairs and scales.

♂. Flagellar segments with almost globular nodes, the most distal whorl of hairs not much beyond middle of node, the hairs more numerous, darker, and more spreading than in *muscorum*; terminal segment constricted, the neck thick. Hypopygium: the combined ninth tergite and anal segment forming an arch of even breadth, not bilobed; style short and broad, not tapering and without spine at tip. Tergites 6-8 forming linear strips as usual. Wing-length 0.8 mm.

♀. Flagellar segments with necks not very long, about equal to nodes, terminal segment elongate-oval without obvious constriction; each segment except the last with two rather stout sensoria. Spermathecae apparently absent (not traceable in either of the specimens mounted). Cerci elongate-oval. Wing-length 0.8-1 mm.; body (extended) 1.5 mm.

HERTS.: Letchworth, summer 1936, 2 ♂♂, 2 ♀♀ on window.

J. palustris Kieff. (?) (fig. 27, m-t).

A small species with costa ending abruptly at tip of *R*₅; scales of body, legs and wings as in *muscorum* except that there are few or no scales on the mesonotum. Palpi 3- or 4-segmented, fourth segment when present smaller and shorter than third.

♂. Flagellar segments sometimes unicolorous, sometimes with the distal half of the globular node paler than the basal half, in either case the most distal whorl of pale hairs (comprising about 12-15 hairs) is not much beyond middle of node; necks very long; terminal segment constricted, the neck narrow, distal portion variable in size and shape. Tergites 6-8 forming linear strips. Hypopygium small; anal segment bilobed; style tapering to the tip and with a rather thick bare beak the tip of which is usually rounded, but sometimes pointed. Length of wing 0.8-1 mm.

♀. Flagellar segments with necks slender, about as long as nodes; last (9th) segment with distal part narrowed; sensoria rather short and not very stout, 2-4 on each segment except the last. Spermathecae present in all specimens examined, small, round and very pale. Length of wing 0.7-1 mm.; body (extended) 1.3 mm.

HERTS.: Letchworth, vii.-ix.1936-7, 8 ♂♂, 7 ♀♀. LONDON: British Museum (Natural History), vii.1938, 1 ♂. SWEDEN: In lucerne fields, 1937, 3 ♂♂, 1 ♀ (*F. Ossiannilsson*).

The only one of Kieffer's earlier descriptions which could apply to this seemingly common and widespread species is that of *J. palustris*; I therefore adopt this name for it. According to a paratype I have mounted *J. seychellensis* Kieffer differs but little from *palustris* (it is very small; wing only 0.65 mm.). On the other hand, the variation noted among British specimens suggests that more than one species may have been included under this name.

J. kiefferiana Enderlein (fig. 27, u).

♀. First five flagellar segments with necks not or scarcely half as long as nodes (remainder of antenna missing in type); four moderately stout simple sensoria reaching beyond end of neck (not differing so much in thickness as shown in figure); median whorl not very dense. Palpi 4-segmented but not long, fourth segment slightly longer than third. Abdomen with narrow scales on sternites and sides, also on tergites 1-5 (but these just possibly displaced from other parts of the body in mounting); tergites 6-8 quite bare. No trace of spermathecae. Wings with curved hairs, no scales visible; costa ending at tip of *R*₅; *R*₁ rather longer than usual. Length of body about 2.5 mm.; wing 1.6 mm.

Redescribed from Enderlein's type, lent from the Stettin Museum through the kindness of Dr. A. Kästner; it is in poor condition. The necks of the flagellar segments are shorter than in any other species of the genus known to me.

J. nodosa sp. n. (fig. 28, h-m).

A small species with costa ending abruptly at tip of *R*₅; femora and tibiae with fairly broad scales as in *muscorum* and *palustris*; few scales on mesonotum and none on abdominal tergites. Mesonotum and legs dark. Palpi 4-segmented, bearing scales. Wings with narrow scales.

♂. Flagellar segments with the most distal hair-whorl close to base of neck and rather dense, as in *memorum*, but the few isolated hairs beyond this very short; necks not or scarcely longer than nodes; terminal segment (in type) oval, somewhat pointed, without trace of constriction. Tergites 6-8 each with a knot-like widening in middle (this being an obvious distinction from all other species of the genus known to me). Hypopygium: style rather narrow, pointed; aedeagus of distinctive form. Wing-length 1.0 mm.

♀. A single female is associated with the males as it has the last antennal segment oval, not narrowed distally. Sensoria slender and inconspicuous, three or four on each segment. Leg-scaling as in ♂. Spermathecae apparently absent. Length of wing 0.8 mm.; body (not fully extended) 0.9 mm.

YORKS.: Mulgrave Woods, nr. Whitby, viii.1937, 1 ♂, type (*H. Britten*, jr.). HERTS.: Letchworth, summer 1936, 1 ♂, 1 ♀ on window.

J. nemorum sp. n. (fig. 28, n, o).

A small species with costa ending abruptly at tip of *R*₅; scales of femora and tibiae very narrow, those of tarsi broader; no scales on mesonotum or abdominal tergites. Palpi 4-segmented, fourth as long as third. Vestiture of wings not very dense, consisting of flattened hairs.

♂. Flagellar segments with the most distal whorl of hairs close to base of neck and rather dense (15-20 hairs), the few isolated hairs beyond this longer than usual, some reaching middle of neck; necks much longer than nodes; terminal segment with a short constriction, the distal part small and rounded. Tergites 6-8 linear as usual. Hypopygium: anal segment bilobed; style slightly widened beyond middle, tip rounded and without spine; aedeagus of distinctive form. Wing-length 1.2 mm.

♀. Antennae broken in the single specimen available; nodes oval, with 3-6 slender sensorial hairs; necks longer than nodes. No trace of spermathecae in the mount. Length of wing 1.3 mm.

HERTS.: Sherrard's Wood, Welwyn, 23, 30.ix.1937, 4 ♂♂ (incl. type), 1 ♀.

J. fungicola Kieff. (fig. 28, a-f).

Differs from the other species in being much more scaly; the whole abdomen (tergites, lateral membrane and sternites) densely clothed with small scales; numerous rather long and narrow scales mixed with the dorso-central hairs and spreading out to form two broad bands on the mesonotum; femora and tibiae as well as tarsi clothed with broad scales. Palpi 4-segmented, fourth segment longer than third. Mesonotum blackish, not noticeably shining; pleura and abdomen pale. Wings densely clothed with narrow, curved black scales; *R*₁ over twice *R*₅; costa ending abruptly at tip of *R*₅.

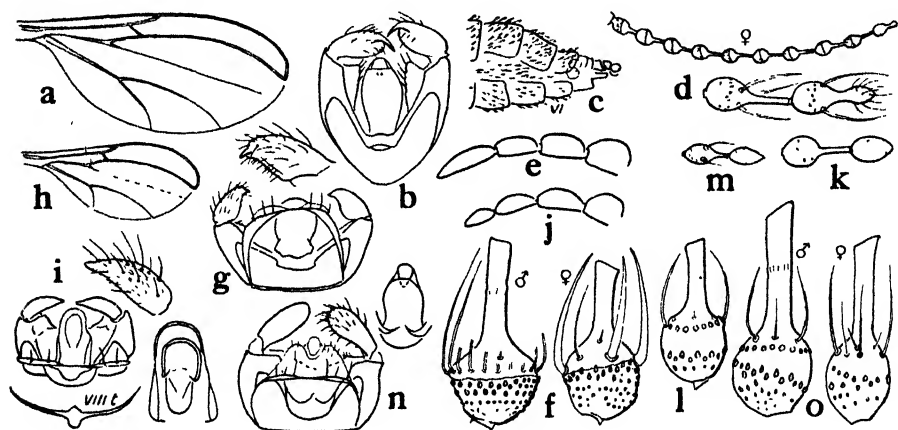
♂. Flagellar segments with basal half of node dark, with dense verticils; distal half pale; just beyond the middle is a dense verticil of pale sensorial hairs, about 16-20 hairs in the ring; necks of only moderate length and darkened; terminal segment constricted in middle. Hypopygium: style with a long terminal spine; anal segment not bilobed. Length of wing 1.2 mm.

♀. Flagellum 10-segmented (thus differing from all the other British species so far known); terminal segment with distal half narrow; nodes with basal half dark as in ♂; sensoria usually four on each segment, thick but very pale. Abdomen rather plump and scarcely extensible, the two spermathecae small, round, pale and unsclerotised, placed near tip of abdomen. Cerci small and round. Wing-length 1.3–1.7 mm.

HERTS.: Letchworth, on window; Welwyn, Sherrard's Wood. BUCKS.: Ivinghoe. HANTS.: New Forest. ix.–x.

One somewhat damaged male from Welwyn (taken with others of this species) perhaps represents another allied species; it has the flagellar segments exactly as described and figured here for *fungicola*, but the hypopygium (fig. 28, g) is rather different; style narrower, with shorter terminal tooth, and aedeagus otherwise.

Kieffer recorded the larvae of *J. fungicola* as feeding on a mould growing on the surface of a toadstool (*Lactarius*).



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FIG. 28.—a–f, *Joannisia fungicola* Kieff.: a, ♂ wing; b, hypopygium; c, tip of ♀ abdomen; d, outline of ♀ flagellum with tip enlarged; e, palpus; f, antennal segments ♂♀. g, *J. fungicola*, var. ?, hypopygium (flattened). h–m, *J. nodosa* sp. n.: h, ♂ wing; i, hypopygium and eighth tergite; style and aedeagus enlarged; j, palpus; k, l, tips of antennae ♂♀; m, antennal segment ♂. n, o, *J. nemorum* sp. n., hypopygium and antennal segments ♂♀.

Peromyia Kieffer.*

This genus only differs from *Joannisia* (s.str.) in having reduced palpi with only two segments instead of three or four, a difference which is less fundamental than between different species of *Joannisia*. *Peromyia* should probably therefore be included under *Joannisia*.

* Felt has suggested that *Neurolyga* Rond. may be an earlier name for *Peromyia* Kieffer, overlooking Rondani's statement that the palpi are composed of four subequal segments. Rondani's description of the male antennae as having 2 + 13 segments does indeed suggest *Joannisia* or *Peromyia* rather than any other genus of the tribe, as among European species at least it is only in these two genera that the twelfth flagellar segment is binodose; however, according to Rondani the female of *Neurolyga* has 10 subcylindrical and sessile flagellar segments, which would exclude *Joannisia*, but could apply to *Campylomyza*. I therefore leave *Neurolyga* as a doubtful synonym of *Campylomyza*.

P. leveillei Kieffer.

Specimens from Kieffer's original series lent me from the Berlin Museum show the following features :—

Eye-bridges three facets wide. Palpi of two segments, second rather longer than first and pointed. Costa reaching slightly but distinctly beyond tip of *R*5. Antenna of ♀ as in *Joannisia*; 2 + 10 segments, last one constricted in middle; sensoria in the form of simple pale bristles. Antenna of ♂ with last segment constricted; nodes of other flagellar segments with subapical whorl of pale hairs. Hypopygium: coxite not lobed at tip; style nearly globular. Spermathecae: two, of moderate size and well sclerotised.

Unidentified genera.

The following Campylomyzine genera were described by Kieffer from the larvae only. When these larvae can be re-discovered and reared it may be found that the adults correspond with some of those described in this series of papers.

Calospatha Kieff. (type *fagicola* Kieff.). Larvae in rotten beech wood.

Trichelospatha Kieff. (type *conigera* Kieff.) and *Tricolpodia* Kieff. (type *anomala* Kieff.). Larvae in rotten oak wood.

Stenospatha Kieff. (type *eriphori* Kieff.). Larvae under submerged leaf-sheaths of cotton-grass. Messrs. Bagnall and Harrison have recorded as *S. eriphori* larvae found in similar situations in several localities in Britain; in one of their localities, Whixall Moss, Mr. C. H. W. Pugh searched in vain for Campylomyzine larvae but did discover Cecidomyiine larvae at roots of cotton-grass.

BOOK NOTICE.

Studien zu den deutschen Lycaenen mit besonderer Berücksichtigung der weiblichen Androkonien. Inaugural-Dissertation . . . der . . . Universität zu Jena. Von P. TRÜBSBACH. (*Ber. naturw. Ges. Chemnitz* 25 : 1–54.) 1938. pp. 56, 4 pls.

This booklet is by a chemist interested in Entomology, and concerns itself largely with the origin and cause of sexual dimorphism in LYCAENIDAE.

The origin of constant forms of Lycaenids is explained and special attention is given to a study of the androconia.

BOOK NOTICE.

A catalogue of the original descriptions of the Rhopalocera found north of the Mexican border. Part 1. The Hesperioidea. By E. L. BELL. (*Bull. Cheyenne Mtn Mus., Colo.* 1 (1) : H1–H35.) 1938. Price 50 cents.

This first number of the Bulletin of the Cheyenne Mountain Museum is at once the first part of the catalogue of the original descriptions of North American Rhopalocera. As may be noticed, the pagination of this part is prefixed by the letter H, presumably indicating its contents.

The paper gives full bibliographical references to the place of original description, the references arranged as follows: name, author, original genus where not the genus recognised to-day, journal or work containing the description, date, and, finally, type locality.

In the case of genera the citation of type locality is replaced by the genotype.

The Catalogue is under the editorship of F. Martin Brown, and further families of Rhopalocera are announced as in preparation.

NOTES ON AFRICAN CERATOPOGONIDAE (DIPTERA)

By BOTHA DE MEILLON, D.Sc., F.R.E.S.

THE types of the new species described in this paper are deposited in the collection of the South African Institute for Medical Research, Johannesburg.

Culicoides distinctipennis Austen.

1912. *Culicoides distinctipennis* Austen, *Bull. ent. Res.* 3: 101. (Southern Nigeria; Uganda Protectorate.)

1935. *Culicoides wansonii* Goetghebuer, *Rev. Zool. Bot. Afr.* 26: 477. (Banana, Belgian Congo.)
syn. n.

Through the kindness of Dr. Wanson of Matadi, Belgian Congo, I have been able to examine the type specimen of *C. wansonii* Goetghebuer. The ornamentation of the wing, the character of the spermatheca as well as other features of this specimen leave no room for doubt that it is the same as *C. distinctipennis* Austen.

Stilobezzia Kieffer.

1911. *Stilobezzia* Kieffer, *Rec. Indian Mus.* 6: 118.

1915. *Parabezzia* Malloch, *Bull. Ill. Stat. Lab. nat. Hist.* 10: 358.

1915. *Hartomyia* Malloch, *Bull. Ill. Stat. Lab. nat. Hist.* 10: 339.

1921. *Eukraiohelea* Ingram & Macfie, *Ann. trop. Med. Parasit.* 15: 347.

These genera are all allied to *Stilobezzia* in having the median fork petiolate. *Eukraiohelea* has the fore-femora spined and so differs from *Parabezzia* and *Stilobezzia*. *Parabezzia* is apparently only separable from *Stilobezzia* in having but one radial cell. Johannsen* has already commented on the close relationship of these three genera and proposed to sink *Eukraiohelea* under *Parabezzia* as he pointed out that femoral spines are not a good generic character. I have recently had the opportunity of examining some *Parabezzia poikiloptera* Ing. & Macfie and *Eukraiohelea versicolor* Ing. & Macfie from Lourenço Marques, Portuguese East Africa, and find that they both resemble *Stilobezzia* in pharyngeal characters. Further, *P. poikiloptera* has a distinct though small first radial cell. In Ingram and Macfie's figure of this species the first radial cell is shown as absent, but in my specimens, which agree with their description in all other respects, the condition is somewhat as in Malloch's figure of *Hartomyia picta* Mall., though the first cell is still smaller. *Hartomyia* is considered to be a synonym of *Stilobezzia*. I have also found that *Parabezzia poikiloptera* and *Eukraiohelea versicolor* further resemble *Stilobezzia* in the presence of mesonotal pits and in having the alula fringed.

Palpomyia fusca sp. n.

♂. A dark brown shiny midge with pale brown tarsi except the fifth segments which are also dark brown. *Head.* Eyes widely separated, bare except along the inner margins; palps very short, measuring 0.1 mm., apparently four segmented; third segment not swollen and without a sensory pit. *Antennae.* These were unfortunately lost during the

* Johannsen, O. A., 1934, New Species of North American CERATOPOGONIDAE and CHIRONOMIDAE. *J.N.Y. ent. Soc.* 62: 344-355.

process of mounting. *Mesonotum*. Very dark brown, shiny, with some heavy bristles above the wing roots; pleura brown; scutellum dark brown with about six bristles and a few small hairs. *Halteres*. Light brown. *Legs*. Extreme bases of the femora pale brown, rest dark brown, armed with heavy black spines as follows: 6-8 on the fore legs,

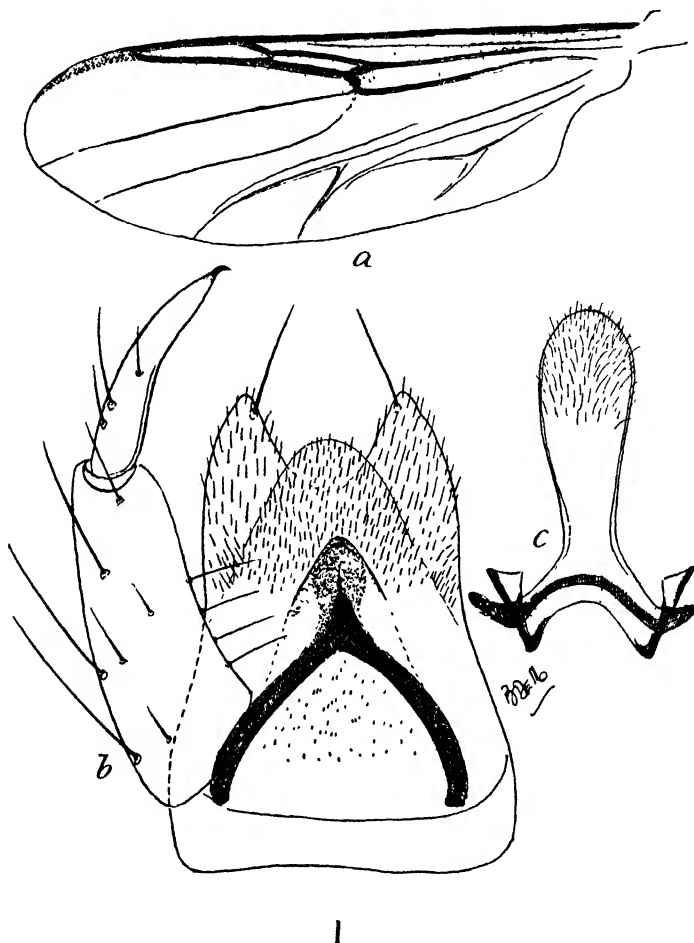


FIG. 1.—*Palpomyia fusca* sp. n.: a, wing (fringe not shown); b, IXth segment, aedeagus side-piece and clasper, ventral view; c, parameres.

3-3 on the mid legs and 3-4 on the hind legs; all tibiae dark brown throughout with a long apical black spine on the mid legs; tarsi I-IV pale brown, on the hind legs I and II armed with "bulbous" hairs; tarsus IV elongate on all legs; tarsus V unarmed, dark brown on all legs and contrasting sharply with the rest of the tarsi; claws simple and equal and about half the length of tarsus V on all legs. *Wing* (fig. 1, a). The ratio of the total wing length to that of the costa is 1:0.8; the second radial cell slightly longer than the first; median fork only just sessile, fork of cubitus slightly beyond cross-vein, costal margin somewhat darkened. *Abdomen*. Dark brown throughout. *Terminalia* (figs. 1, b, 1, c). IXth sternite slightly excavated, the membrane spiculate; IXth tergite slightly longer than the side-pieces deeply excavated apically; side-pieces normal slightly narrower

apically; claspers well developed, of almost even width throughout, but gradually narrowing down to end in a pointed well-pigmented beak-like termination; aedeagus scoop-shaped; parameres fused, hairy apically, somewhat club-shaped.

PORTUGUESE EAST AFRICA. Lourenço Marques, 1 ♂, ii.1938.

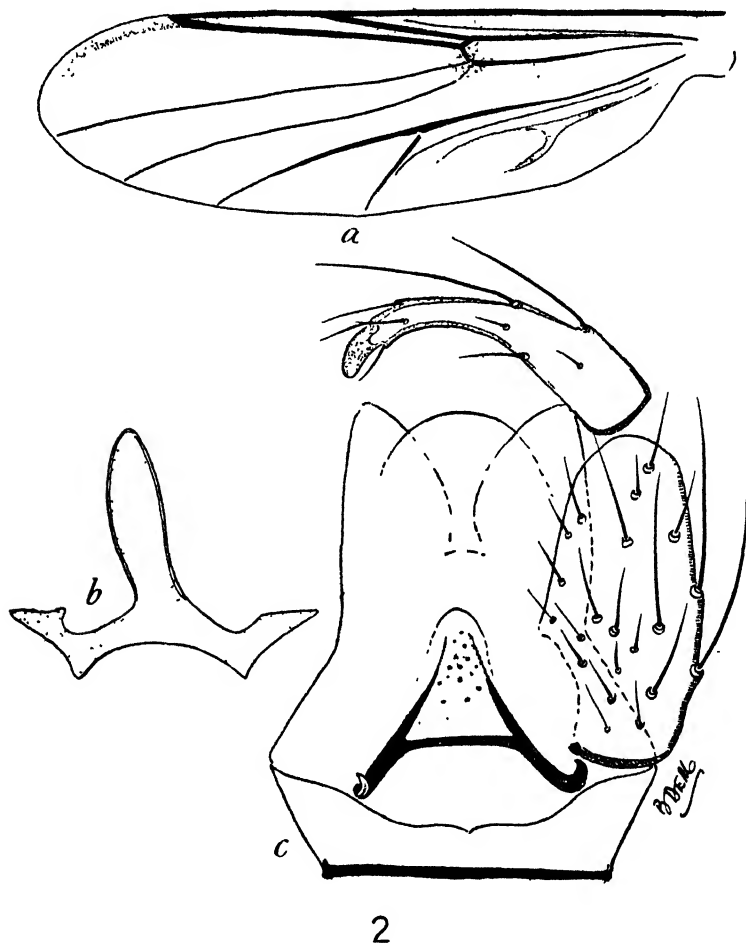


FIG. 2.—*Bezzia edwardsi* sp. n.: a, wing (fringe not shown); b, outline of parameres; c, ventral view of IXth segment and aedeagus.

This insect differs principally from related species, in which the terminalia have been described, in having the parameres hairy. It may possibly be Goetghebuer's *P. spinulosa*, from the Belgian Congo; a species, however, which is insufficiently described.

***Bezzia edwardsi* sp. n.**

♂. A medium-sized very dark brown species. *Wing length.* Greatest length 1.8 mm., greatest width 0.5 mm. *Head.* Vertex, clypeus and mouth parts dark brown;

eyes widely separated above, bare except along the inner margins. *Palpi*. Short, only slightly longer than the proboscis, third segment not swollen and without a sensory pit, about as long as IV and V together. *Antennae*. Tori very dark brown, rest a shade paler; third segment with a long stalk which is paler than the rest of that segment; IV-IX slightly longer than wide, barrel shaped; X about twice as long as wide; the relative lengths of the last six segments are 15, 20, 29, 30, 38 and 41. *Mesonotum*. Dark brown, shiny in some lights, viewed from the front and with the light from above there is present a dark brown median stripe and one small admedian brown dot in front on each side of the stripe, in such light the sides of the mesonotum appear to be greyish; pleura dark brown, epimeron of the second leg with eight bristles, these bristles appear to be absent or very much weaker in species of *Probezzia*. *Scutellum*. Dark brown throughout with about six long bristles and numerous smaller ones. *Wings* (fig. 2, a). Of the type usually seen in this genus; the ratio of the costal length to total wing length is 1:1.2; cross-vein before the middle of the wing; cubitus forks beyond the cross-vein; median fork only just sessile. *Legs*. Very dark brown but tarsi a shade paler; femora of the fore legs somewhat swollen with a subapical dark band and the apex somewhat paler than the rest of the segment, on the mid and hind legs pale apically without the subapical dark band; femora armed with short stout spines as follows: on the fore legs 3-2, mid legs 1-1, hind femora unarmed; tibiae of the fore legs somewhat darkened in the middle, on the mid and hind legs slightly paler basally only, mid tibiae with a short stout black spine. All tarsi unarmed, but first and second tarsus of the hind and mid legs with rows of "bulbous" hairs; fourth tarsus not cordiform or bilobed, somewhat longer than broad; fifth tarsus slightly darkened. Claws simple, equal. *Abdomen*. Very dark brown, shiny. *Terminalia* (fig. 2, b, 2, c). Ninth sternite deeply excavated, bearing some long strong bristles; membrane bare; tergite about as long as the side-pieces bilobed apically; side-pieces well developed; claspers well developed, about as long as the side-pieces, each ending in a well-pigmented beak-like termination; aedeagus of the usual shape but provided with a number of small dark nodules; parameres fused, well pigmented.

Locality. N. RHODESIA; Luanshya, iv.1938. 3 ♂♂, bred from pupae collected amongst vegetation in a stream.

This insect somewhat resembles *B. dewulfi* Goetg., but the fourth tarsus is not cordiform and in the adult, though dark, it is certainly not shiny black. It may possibly be the male of *B. foyi* Ing. & Macfie. The terminalia resembles those of many *Probezzia* but is sufficiently distinct to make it easily recognisable.

The insect is named in honour of Dr. F. W. Edwards, to whose interest and encouragement I owe much.

Macroptilum aethiopicum Ingram & Macfie.

1923. *Macroptilum aethiopicum* Ingram & Macfie, *Bull. ent. Res.* 14:45. (Mfongosi, Zululand.)

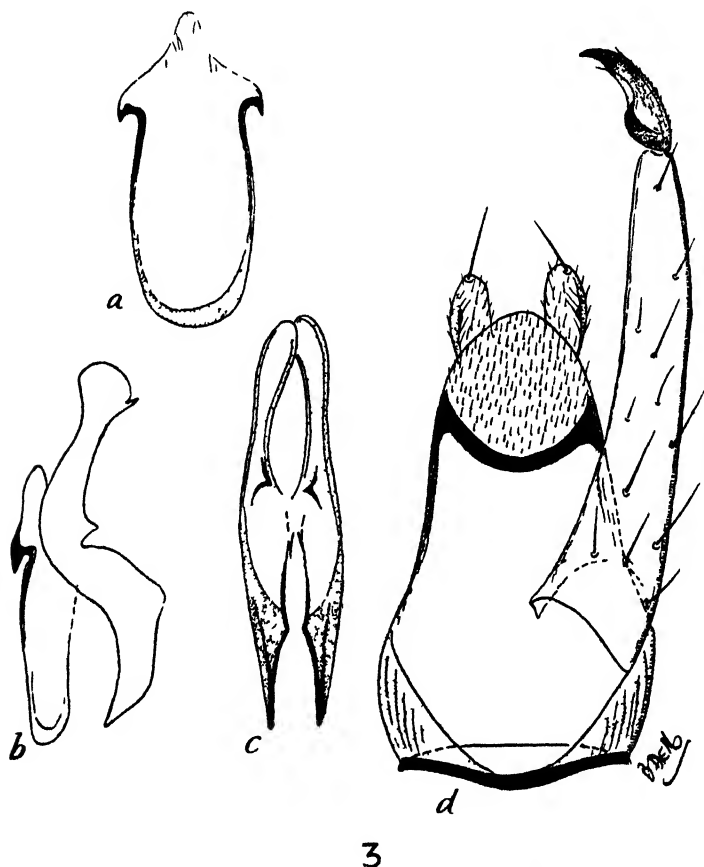
1936. *Macroptilum meeseri* De Meillon, *Publ. S. Afr. Inst. med. Res.* 7:204. (Mseleni, Zululand.)

1937. *Macroptilum aethiopicum* Ingram & Macfie, De Meillon, *Publ. S. Afr. Inst. med. Res.* 7:351, 353, 357. (N'Kana, N. Rhodesia.)

I have recently secured a few more specimens of this species from N. Rhodesia and amongst them were some males. These males differ from the females in the same way as I have reported for *M. natalensis* De Meill. (1937), that is, they are much smaller than the females and the cross-vein is approximately in the middle of the wing. In the description of *M. bayeri* De Meill. (1937), of which only the male is known, I suggested that it might eventually prove to be that of *M. aethiopicum* Ingram & Macfie. The present material, however, leaves no room for doubt that *M. bayeri* is a separate species. As the

male of *M. aethiopicum* has not been described I append a short description of its salient features.

♂. A dark brown insect similar in coloration to the ♀. *Wing length*. 1.6 mm., greatest width 0.5 mm. *Antennae*. Much as in *M. bayeri* and *M. natalensis*, but resembling the former in having segment XV appreciably longer than XIV. *Wing*. As in *M. bayeri* and *M. natalensis*. *Legs*. The ratio of the hind tibia to the first hind tarsus is 1.2:1; the relative lengths of hind tarsi are I, 26; II, 13; III, 7; IV, 2.5; V, 3. *Scutellum*. With five weak bristles. *Terminalia* (fig. 3). IXth sternite deeply excavated, tergite long with a pair of apical processes; side-pieces very long, measuring 0.26 mm. in length, claspers short with a well-pigmented pointed apex; aedeagus weakly pigmented, almost colourless, with a lateral hooked process on each side on the distal half; parameres fused in the middle with long pointed basal processes and two separated club-shaped apical processes.



3

FIG. 3.—*Macroptilum aethiopicum* Ingram & Macfie. a, aedeagus; b, parameres and aedeagus, side view; c, parameres, ventral view; d, IXth segment, side-piece and clasper, ventral view.

This species closely resembles *M. bayeri* and *M. natalensis*, but is easily separated by the character of the parameres.

Locality: N. RHODESIA; Luanshya, iv.1938.

TWO PARLATORIINI FROM INDIA (HEMIPTERA, COCCIDAE)

By RYOICHI TAKAHASHI.

Communicated by Sir GUY A. K. MARSHALL, F.R.S., F.R.E.S.

Cryptoparlatoria pini sp. n.

Adult ♀. Scale yellowish-brown, sometimes blackish, covered with whitish secretion, long, narrow, convex dorsally, straight, with no ridge, with no secretion behind and laterad of the 2nd skin, about 1·8–2·0 mm. long. The 1st skin pale yellowish-brown, at the front end, about 0·48–0·51 mm. long, about 0·36–0·37 mm. wide; the antennae 5-segmented, a little longer than the space between themselves, the last segment a little longer than the basal 4 taken together; the median lobes wider than long, truncate at the apex, very widely

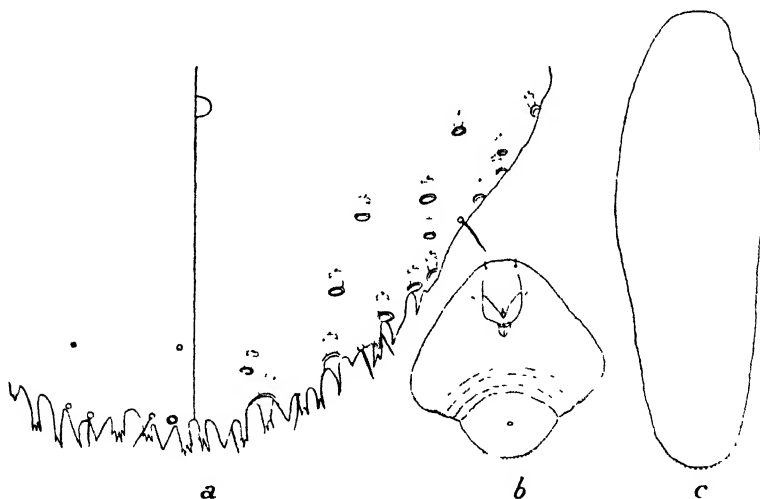


FIG. 1.—*Cryptoparlatoria pini* sp. n., adult female. *a*, pygidium; *b*, body; *c*, second skin.

apart; the 2nd lobes much smaller; the 3rd not discernible. The 2nd skin long, narrow, straight, not constricted, slightly widened on the anterior half except on the front end, about 1·8–2·0 mm. long, about 0·5 mm. wide, with no distinct furrow; the median lobes slightly longer than wide, truncate at the apex, not notched or serrate, parallel, as long as the fimbriated plates, nearly as long as the marginal gland ducts; the 2nd lobes similar to and scarcely smaller than the median; the 3rd lobes smaller than the 2nd, somewhat pointed or rounded apically, sometimes notched on the outside; the 4th lobes absent or represented by rudimentary pointed processes; 2 slender fimbriated plates present between the median lobes, and also between the median and 2nd lobes; 3 similar plates between the 2nd and 3rd lobes; about 11–15 wide fimbriated plates beyond the 3rd lobes, which are mostly wider than long, distinctly separated from each other, and some of them are somewhat narrowed towards the base; about 10 marginal glands present on each side, which are stout, nearly as long as wide, much thickened on the margin of orifice, and the anterior

ones are smaller; a median marginal gland present; about 6-8 submarginal gland ducts present on each side, which are as large as the anterior marginal ones.

Body wide, broadest at the middle, narrowed towards both ends, a little longer than wide, much shorter than the 2nd skin, broadly rounded at the front, with no lateral projection, about 0.53 mm. long. Prosoma with a few very small lateral ducts, and some very small ducts between the anterior and posterior spiracles; abdominal segments not convex laterally, lacking gland spines, with some lateral gland ducts. Antennae close to the front end, with a long bristle. Mouth-parts rather large. Spiracles without pores.

Pygidium rather large, much wider than long, with many longitudinal dorsal lines. Anal opening nearly at the centre. Median lobes conical, longer than wide, pointed apically, widely apart, parallel, not notched or serrate; the 2nd lobes similar to, as large as, or very slightly smaller than, the median; the 3rd lobes very short, conical, pointed; the 4th lobes wanting; 2 slender plates between the median lobes, and also between the median and the 2nd lobes, which are as long as the median lobes and fimbriate at the apex; 3 similar ones between the 2nd and the 3rd; 3-5 conical or divided plates outside of the last lobes, some of which are spine-like. About 8 marginal gland ducts present on each side, which are thickened on the margin of orifice, and the posterior ones are larger, somewhat longer than wide, and as long as the 2nd lobes; no median gland duct discernible. About 7 submarginal dorsal gland ducts present on each side, which are as large as the marginal ones. About 5 long setae present on each side. Circumgenital pores in 4 groups, the anterior groups with about 11-14 pores, the posterior with about 17 or 18. Venter with about 4 pairs of minute submarginal setae.

Habitat. INDIA: Manali, Punjab.

Many specimens were collected on the leaves of *Pinus* sp. by Mr. Ansari and sent for identification by Sir Guy A. K. Marshall.

This species is allied to *Cryptoparlatoria leucaspis* Lindinger, but differs in the elongate second skin, the median lobes being as long as the fimbriated plates, some plates outside of the last lobes being spine-like, and in other structures.

Parlatoria pseudopyri Kuwana.

1932, *J. Plant Prot., Tokyo* 19: 15.

Habitat. INDIA: Lyallpur and Bhakar, Punjab; Shab Qadar, N.W.F. Province.

Many specimens were taken on rose, jasmine, mango and the "Dharak" plant, in June, September and October, 1937, by Messrs. Ansari, F. Haque and A. Nand, and sent for determination by Sir Guy A. K. Marshall.

Previously known only from Hongkong. Closely allied to *Parlatoria oleae* Colvée (syn. *P. calanthina* Berl. et Leon.), but differs in the median lobes being deeply notched on both sides. Differentiated from *P. pyri* Marlatt by the larger third lobes, the presence of more dorsal gland ducts on the pygidium, and by the more developed fimbriated plates, which are about 16 in number on each side beyond the last lobe; and from *P. atalantiae* Green by the anterior spiracles with 4-6 parastigmatic pores, the distinctly fimbriated plates between the lobes, the presence of 3 plates between the second and third lobes, and of many plates beyond the last lobes, the lobes being not serrate, the marginal gland ducts more in number, and by the presence of dorsal gland ducts on the pygidium.

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